

Rui Liu

PH.D STUDENT · DATA MANAGEMENT & DISTRIBUTED SYSTEM

Department of Computer Science, University of Chicago

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Education

University of Chicago

PH.D. IN COMPUTER SCIENCE, WITH FULL SCHOLARSHIP

USA

Sep. 2017 - Present

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

The Hong Kong Polytechnic University

M.PHIL. IN COMPUTER SCIENCE, WITH FULL SCHOLARSHIP

Hong Kong SAR, China

Oct. 2012 - Dec. 2015

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

Northeastern University

B.ENG. IN SOFTWARE ENGINEERING, FIRST HONOR

China

Sep. 2008 - Jun. 2012

- Under the supervision of Prof. Ruiyun Yu

Experience

Department of Computer Science, National University of Singapore

Research Assistant, working with Prof. Beng Chin Ooi (Fellow of ACM, IEEE, SNAS)

Singapore

Aug. 2016 - June. 2017

Working on distributed data management, data cleansing, and blockchain

Department of Information Engineering, The Chinese University of Hong Kong

Research Assistant, working with Prof. Kehuang Zhang

Hong Kong SAR, China

Mar. 2016 - Aug. 2016

Working on system security

Harbin Institute of Technology

Visiting Student for Big Data Management and Analysis Program

China

Jun. 2015 - Jul. 2015

International Volunteer Program

International Volunteer, helping to teach people who didn't have regular education chances

Patong Town, Thailand

Jul. 2012 - Oct. 2012

State Key Laboratory of Synthetical Automation for Process Industries

Assistant Engineer Internship, working on a joint project with State Grid Corporation of China

China

Oct. 2011 - Jan. 2012

Environment Computing Group, IBM China Research Laboratory

Student Internship, working on Smart City Program for Shenyang City

China

Jun. 2010 - Dec. 2010

Projects

Draining the Data Swamp

CORE MEMBER

UChicago

Ongoing

- Build service-oriented tools to aid users in finding relevant datasets and understanding scope of files in a data lake
- I am responsible for the developing a tool for metadata analysis and schema explorer. I also explore the idea of applying deeping learning into the data swamp.

BlockBench: A Framework for Analyzing Private Blockchains

CORE MEMBER

NUS

- 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 was responsible for the Hyperledger part, eg., I built Hyperledger(v0.6.0 and v1.0.0) in a private network, implement APIs, and conducted evaluation to measure its performance. I was a major contributor to conduct a comprehensive survey on all popular blockchain platforms.

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 evaluated the current implementation and improve the parallelism of GAM. More specifically, I implemented 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 concentrated on developing the DICE-Core, which is used to generate optimal execution plans for different work-flows, 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 helped 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 worked 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 was 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 designed and implemented 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.

Selected Publication

- Conference** Will Brackenbury, **Rui Liu**, Mainack Mondal, Aaron Elmore, Blase Ur, Kyle Chard, Michael Franklin, "Draining the Data Swamp: A Similarity-based Approach", Workshop on Human-In-the-Loop Data Analytics (HILDA@SIGMOD), Houston, TX, USA. 2018
- Conference** Anh Dinh, Ji Wang, Gang Chen, **Rui Liu**, Beng Chin Ooi, 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, Weiping Zhu, Sebastian Vansyckel, Christian Becker, "UIO-based Testbed Augmentation for Simulating Cyber-Physical Systems", accepted by IEEE Intelligent Systems (IS), doi:10.1109/MIS.2018.111144927.
- Journal** Wenrui Diao, Rui Liu, Xiangyu Liu, Zhe Zhou, Zhou Li, Kehuan Zhang, "Accessing mobile user's privacy based on IME personalization: Understanding and practical attacks", Journal of Computer Security (JCS), 2018, vol. 26, no. 3, pp. 283-309, doi:10.3233/JCS-16909.
- Journal** Anh Dinh, Rui Liu, Meihui Zhang, Gang Chen, Beng Chin Ooi, Ji Wang, "Untangling Blockchain: A Data Processing View of Blockchain Systems", accepted by IEEE Transactions on Knowledge and Data Engineering (TKDE), doi:10.1109/TKDE.2017.2781227.
- 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.
- 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.
- 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.
- 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, doi:10.3390/s140305573. (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*