

Ryan (Peng) Huang

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Research Interests

Computer systems, software engineering, programming language

The overarching goal of my research is to enable building reliable, efficient, and defensible systems in new computing platforms including cloud, mobile and IoT. Toward this goal, my research often intersects with programming language, and software engineering. Recent projects include the gray failure challenge, analysis of cloud fault-tolerance, declarative specification to validate cloud configuration, and defensive mobile OS against wimpy apps.

Education

- Sept. 2016 **Ph.D., Computer Science.**
University of California San Diego
Advisor: Prof. Yuanyuan Zhou
Thesis: Toward Understanding and Dealing with Failures in Cloud-Scale Systems
- March 2014 **M.S., Computer Science.**
University of California San Diego
Advisor: Prof. Yuanyuan Zhou
- July 2010 **B.S., Computer Science & B.A., Economics.**
Peking University. Graduate with honor.
Thesis: Design and Implementation of a Decentralized Social Network (*Outstanding Bachelor's Thesis*)

Professional Experience

- 08/2017– **Assistant Professor**, *Johns Hopkins University*, Baltimore, MD.
Department of Computer Science
- 08/2016– **Post-doc Researcher**, *Microsoft Research*, Redmond, WA.
07/2017 Systems Research Group
- 10/2015– **Part-time contractor**, *Facebook*, Menlo Park, CA.
04/2016 Researched gaps and opportunities in catching misconfiguration in large infrastructure
- 06/2015– **PhD Intern**, *Facebook*, Menlo Park, CA.
09/2015 Restructured a critical component in the configuration management system. Built a configuration reaping service.
- 06/2014– **Research Intern**, *Microsoft Research*, Redmond, WA.
09/2014 Designed a new specification language to allow developers and operators to easily express configuration validation requirements.
- 06/2013– **Research Intern**, *Microsoft Research*, Redmond, WA.
09/2013 Analyzed service disruptions that happened inside Microsoft Azure to understand the unique failure patterns and improvement areas.
- 11/2011– **Part-time Research Intern**, *Teradata Corporation*, San Diego, CA.
12/2012 Developed automated analysis tools that achieved more than 90% balanced analysis accuracy while reducing the analysis time from several man-day to minutes.

- 03/2010–**Software Engineer Intern**, *Youdao Search Engine, NetEase*, Beijing, China.
06/2010 Designed and implemented features in Youdao search engine (Chinese poem search, live search stream for 2010 FIFA World Cup), which was deployed in production.

Publications

- [HotOS '17] **Peng Huang**, Chuanxiong Guo, Lidong Zhou, Jacob R. Lorch, Yingnong Dang, Murali Chintalapati, and Randolph Yao. Gray failure: The achilles' heel of cloud-scale systems. In *Proceedings of the 16th Workshop on Hot Topics in Operating Systems*, HotOS '17, Whistler, British Columbia, Canada, May 2017.
- [OSDI '16] Tianyin Xu, Xinxin Jin, **Peng Huang**, Yuanyuan Zhou, Shan Lu, Long Jin, and Shankar Pasupathy. Early detection of configuration errors to reduce failure damage. In *Proceedings of the Twelfth USENIX Symposium on Operating Systems Design and Implementation*, OSDI '16, Savannah, GA, November 2016. **Best Paper Award**.
- [MobiSys '16] **Peng Huang**, Tianyin Xu, Xinxin Jin, and Yuanyuan Zhou. Defdroid: Towards a more defensive mobile os against disruptive app behavior. In *Proceedings of the Fourteenth Annual International Conference on Mobile Systems, Applications, and Services*, MobiSys '16, pages 221–234, Singapore, Singapore, 2016. ACM.
- [EuroSys '16] Xinxin Jin, **Peng Huang**, Tianyin Xu, and Yuanyuan Zhou. Nchecker: Saving mobile app developers from network disruptions. In *Proceedings of the Eleventh European Conference on Computer Systems*, EuroSys '16, pages 22:1–22:16, London, United Kingdom, 2016. ACM.
- [EuroSys '15] **Peng Huang**, William J. Bolosky, Abhishek Singh, and Yuanyuan Zhou. ConfValley: A systematic configuration validation framework for cloud services. In *Proceedings of the Tenth European Conference on Computer Systems (EuroSys)*, pages 19:1–19:16, Bordeaux, France, April 2015.
- [OSDI '14] **Peng Huang**, Xinxin Jin, William J. Bolosky, and Yuanyuan Zhou. Why does a cloud-scale service fail despite fault-tolerance? In *The 11th USENIX Symposium on Operating Systems Design and Implementation (OSDI)*, Broomfield, CO, October 2014. **Accepted with high reviews but withdrawn from publication per request by Microsoft Azure**.
- [ICSE '14] **Peng Huang**, Xiao Ma, Dongcai Shen, and Yuanyuan Zhou. Performance regression testing target prioritization via performance risk analysis. In *Proceedings of the 36th International Conference on Software Engineering (ICSE)*, pages 60–71, Hyderabad, India, May 2014.
- [SOSP '13] Tianyin Xu, Jiaqi Zhang, **Peng Huang**, Jing Zheng, Tianwei Sheng, Ding Yuan, Yuanyuan Zhou, and Shankar Pasupathy. Do not blame users for misconfigurations. In *Proceedings of the Twenty-Fourth ACM Symposium on Operating Systems Principles (SOSP)*, pages 244–259, Farmington, Pennsylvania, November 2013.
- [NSDI '13] Xiao Ma, **Peng Huang**, Xinxin Jin, Pei Wang, Soyeon Park, Dongcai Shen, Yuanyuan Zhou, Lawrence K. Saul, and Geoffrey M. Voelker. eDoctor: Automatically diagnosing abnormal battery drain issues on smartphones. In *Proceedings of the 10th USENIX Conference on Networked Systems Design and Implementation (NSDI)*, pages 57–70, Lombard, IL, April 2013.
- [OSDI '12] Ding Yuan, Soyeon Park, **Peng Huang**, Yang Liu, Michael M. Lee, Xiaoming Tang, Yuanyuan Zhou, and Stefan Savage. Be conservative: Enhancing failure diagnosis with proactive logging. In *Proceedings of the 10th USENIX Conference on Operating Systems Design and Implementation (OSDI)*, pages 293–306, Hollywood, CA, October 2012.

[IMC '10] Jing Jiang, Christo Wilson, Xiao Wang, **Peng Huang**, Wenpeng Sha, Yafei Dai, and Ben Y. Zhao. Understanding latent interactions in online social networks. In *Proceedings of the 10th ACM SIGCOMM Conference on Internet Measurement (IMC)*, pages 369–382, Melbourne, Australia, November 2010.

[SCIS '10] Jing Jiang, Yongjun Li, Qinyuan Feng, **Peng Huang**, and Yafei Dai. A multiple user sharing behaviors based approach for fake file detection in P2P environments. *Science China Information Sciences*, 53(11):2169–2184, November 2010.

Technical Report

Peng Huang, Craig Schechter, Vincent Chen, Steven Hill, Dongcai Shen, Yuanyuan Zhou, and Lawrence K. Saul. Experience in building a comparative performance analysis engine for a commercial system. Technical Report CS2015-1014, University of California, San Diego, September 2015.

Awards and Honors

OSDI 2016 Best Paper Award

NSF Travel Grant for MobiSys 2016

Travel Grants for SOSP 2015 2013, EuroSys 2015, OSDI 2014 2012 2010, ICSE 2014, APSys 2011, ISCA 2011

UCSD Fellowship for Graduate Study, 2010–2011

Outstanding Graduate in Beijing, 2010

Outstanding Bachelor's Thesis, Peking University, 2010

Founder Scholarship, Peking University, 2009

China National Scholarship, Ministry of Education of China, 2008

Wusi Scholarship, Peking University, 2007

Mentoring & Teaching

2013 Fall **Research Mentor**, *master student Vincent Chen*, UCSD.

I advised Vincent extensively on his Master thesis “Learning from Imbalanced Data”.

2014 Fall **Teaching Assistant**, *Principles of Operating Systems (CSE 120)*, UCSD.

Held lab hours and discussion sections; graded project submissions.

2014 Winter **Teaching Assistant**, *Advanced Operating Systems (CSE 221)*, UCSD.

Held office hours; graded homework; gave feedback to students for three project milestones.

2013 Spring **Teaching Assistant**, *Principles of Operating Systems (CSE 120)*, UCSD.

Setup course website programming environment and auto-grading system; held lab hours and discussion sections; graded project submissions; wrote an additional fun lab.

2009 Fall **Teaching Assistant**, *Introduction to Computation*, Peking University.

Held lab hours; graded assignments.

Service

○ **Program Committee**: SOSP SRC 2017, USENIX ATC 2017, SIGCOMM HotConNet 2017, MobiSys 2016 PhD forum

○ **Shadow PC**: EuroSys 2017

○ **Journal Reviewer**: IEEE TPDS 2016

- **Assistant for PC chair:** ASPLOS 2016
- **External reviewer:** ASPLOS 2015, OSDI 2014, SOSP 2013, APSys 2013, USENIX 2013, FAST 2013, Micro 2012, APSys 2012, EuroSys 2012, SOSP 2011

Talks

- **CloudBrain: Toward Real-Time Intelligence for Highly-Available Cloud Systems**
Microsoft (Briefing to CVP and EVP), 03/2017, Redmond, WA
Microsoft (Presentation to Azure CTO), 03/2017, Redmond, WA
- **Gray Failure: The Achilles' Heel of Cloud-Scale Systems**
HotOS XVI, 05/2017, Whistler, Canada
- **Systematic configuration validation in cloud services**
Facebook, 06/2015, Menlo Park, CA
EuroSys 2015, 04/2015, Bordeaux, France
CNS Review, 10/2014, San Diego, CA
Microsoft Research, 09/2014, Redmond, WA
- **DefDroid: towards a more defensive mobile OS**
MobiSys 2016, 06/2016, Singapore, Singapore
CNS Review (short talk), 10/2015, San Diego, CA
Syslunch Seminar, 10/2015, San Diego, CA
- **Failures and misconfigurations in Azure – analysis, implications and practices**
Microsoft, 09/2013, Redmond, WA
Microsoft Research, 09/2013, Redmond, WA
- **Performance regression testing target prioritization via performance risk analysis**
ICSE 2014 (with Nima Nikzad), 06/2014, Hyderabad, India
- **eDoctor: Automatically diagnosing abnormal battery drain issues on smartphones**
Peking University, 12/2012, Beijing, China

Software

- **DefDroid:** <http://github.com/DefDroid>
- **PerfScope:** <http://cseweb.ucsd.edu/~peh003/perfscope>