Xiang (Jenny) Ren

Ph.D. Candidate in Computer Engineering
University of Toronto

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EDUCATION

Ph.D. in Computer Engineering — Sep 2017 - present

M.A.Sc. in Computer Engineering — Sep 2015 - Mar 2018
University of Toronto
Advisor: Prof. Ding Yuan

B.A.Sc. with Honours in Electrical Engineering — Sep 2010 - June 2015
University of Toronto

RESEARCH INTERESTS

Understanding and improving the performance and reliability of software systems.

PUBLICATIONS

[1] Ruibin Li, Xiang Ren, Xu Zhao, Siwei He, Michael Stumm, and Ding Yuan. ctFS: Eliminating File Indexing with Contiguous File System on Persistent Memory. To appear *20th USENIX Conference on File and Storage Technologies (FAST 22)*

[2] Xiang (Jenny) Ren, Kirk Rodrigues, Luyuan Chen, Camilo Vega, Michael Stumm, and Ding Yuan. An Analysis of Performance Evolution of Linux's Core Operations. In *Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP19)*, pages 554-569, October 2019. Acceptance rate: 13.7%

[3] Yongle Zhang, Serguei Makarov, Xiang Ren, David Lion, and Ding Yuan. Pensieve: Non-Intrusive Failure Reproduction for Distributed Systems using the Event Chaining Approach. In *Proceedings of the 26th Symposium on Operating Systems Principles (SOSP '17)*, page 19-33, October 2017. Acceptance rate: 16.8%

IMPACT & VISIBILITY

- [1] is featured by the *Morning Paper* and LEBench is requested by Amazon.

PROFESSIONAL EXPERIENCE

- **Research Intern**, Microsoft Research Redmond, Mentor: Suman Nath — June - August 2020
  Project: Automating reproduction of flaky tests in cloud systems.
- **Research Assistant**, University of Toronto, Advisor: Prof. Ding Yuan — May - August 2014
  Project: Automating log analysis of distributed systems.
- **Software Engineering Intern**, Marin Software, San Francisco — May 2013 - May 2014
  Role: Data engineering, web programming & automating integration tests.

- **Research Assistant**, University of Toronto, Advisor: Prof. Tarek Abdelrahman Summer 2012
  Project: Building support of parallel programming Pragmas in the LLVM compiler infrastructure.

AWARDS & SCHOLARSHIPS

- OSDI/SOSP Travel Award 2015, 2017, 2018, 2019
- University of Toronto Fellowship 2019
- Edward S. Rogers Sr. Graduate Scholarships 2018
- Queen Elizabeth II Graduate Scholarship 2017
- Ontario Graduate Scholarship 2016
- Bell Scholarship 2015

SELECTED PROJECTS

- **An analysis of performance evolution of Linux's core operations**: In this study, we evaluate the performance trend of Linuxs core operations over the past 7 years, using a benchmark constructed out of 5 popular real-world workloads. Our study finds that the performance of many core operations has worsened or fluctuated significantly over the years. We further identify 11 root causes responsible for most of the slowdowns – they include new features, security enhancements, and mis-configurations. By disabling these root causes, we speed up Redis, Apache, and Nginx benchmark workloads by as much as 56%, 33%, and 34%, respectively.
- **Pensieve**: Pensieve is capable of automatically reconstructing near-minimal failure reproduction steps from runtime logs and application binary. Because Pensieve does not reconstruct the entire execution, it avoids the path-explosion problems plaguing existing solutions like symbolic execution; Instead, Pensieve applies the Partial Trace Observation inspired by the way human developers diagnose failures - it follows causally dependent control and data dependencies most likely relevant to the failure to reconstruct a simplified execution trace. Pensieve can reproduce 72% of the randomly sampled real-world failures within 10 minutes of analysis time.

TEACHING

- **Teaching Assistant**, ECE297 Design and Communication 2019
- **Teaching Assistant**, ECE 244 Programming Fundamentals 2015, 2016, 2018
- **Teaching Assistant**, CSC369 Operating Systems 2018
- **Teaching Assistant**, APS105 Computer Fundamentals 2017
- **Teaching Assistant**, ECE344 Operating Systems 2016