Ting Dai

919-985-1921 | tdai@ncsu.edu | tingdai.github.io

Research Interests

My general research interests are in the areas of systems, with a current focus on applying static code analysis and machine learning techniques on cloud computing and system reliability. I am also interested in blockchain and cryptography technologies.

Education

- North Carolina State University, Raleigh, NC — 2014 - 2019
  Ph.D. in Computer Science Advisor: Xiaohui (Helen) Gu *GPA: 4.0*
- Nanjing University of Posts and Telecommunications, Nanjing, China — 2011 - 2014
  M.E. in Computer Software and Theory *GPA: 3.78*
- Nanjing University of Posts and Telecommunications, Nanjing, China — 2007 - 2011
  B.E. in Information Security *GPA: 3.85*

Professional Experience

- **Research Assistant NC State Univ. August, 2015 - present**
  - Presented DScope to statically detect data-corruption induced hang bugs in cloud systems, via loop path extraction, I/O dependent loop identification, and false positive pruning.
  - Presented Hytrace, a hybrid approach to performance bug diagnosis in production cloud infrastructures using both static and dynamic analysis.
  - Presented TScope to dynamically identify timeout bugs, via kernel-level system call tracing, ML-based anomaly detection, and feature extraction schemes.
  - Presented TFix to automatically fix timeout bugs, via misused timeout bug classification, timeout affected function identification, misused timeout variable identification, and timeout value recommendation.
  - Empirically studied timeout problems in cloud systems. Comprehensively studied the effectiveness of static & dynamic vulnerability attack detection schemes for containers.
- **Graduate Intern IBM Research May - August, 2018**
  - Developed FabZK to conceal transaction details on a shared ledger by storing only encrypted data from each transaction, and by anonymizing the transactional relationship between members in a Blockchain network. FabZK achieves both privacy and auditability by supporting verifiable Pedersen commitments and constructing zero-knowledge proofs. FabZK supports on-demand, automated auditing based only on the encrypted data.
- **Software Engineer InsightFinder Inc. June - August, 2016**
  - Implemented the InsightAgent to collect system calls and report to the server.
  - Developed the application performance management intelligence engine to identify problems in cloud applications using machine learning algorithms.
- **Research Assistant NC State Univ. & Credit Suisse May - August, 2015**
  - Developed CCM, an open-source Cloud Configuration Management system for elastic application deployment in private clouds. CCM supports automatic component composition and instantiation, and elastic auto-scaling to handle overload conditions and resource contentions.

Selected Publications

*I have published **13** papers in international journals and major peer-reviewed conference proceedings and **6** patents.

1. Jingzhu He, **Ting Dai**, and Xiaohui Gu, "TFix: Automatic Timeout Bug Fixing in Production Server Systems", Proc. of IEEE International Conference on Distributed Computing Systems (**ICDCS**), Dallas, Texas, July, 2019..
2. Hui Kang*, **Ting Dai***, Nerla Jean-Louis, Shu Tao, and Xiaohui Gu, "FabZK: Supporting Privacy-Preserving, Auditable Smart Contracts in Hyperledger Fabric", Proc. of IEEE/IFIP International Conference on Dependable Systems and Networks (**DSN**), Portland, Oregon, June, 2019 (* equal contribution).
3. Olufogorehan Tunde-Onadele, Jingzhu He, **Ting Dai**, and Xiaohui Gu, "A Study on Container Vulnerability Detection", Proc. of IEEE International Conference on Cloud Engineering (**IC2E**), Prague, Czech Republic, June, 2019.
4. **Ting Dai**, Jingzhu He, Shan Lu, Xiaohui Gu, and Peipei Wang, "DScope: Detecting Real-World Data Corruption Hang Bugs in Cloud Server Systems", Proc. of ACM Symposium on Cloud Computing (**SoCC**), Carlsbad, CA, October, 2018.
5. Jingzhu He, **Ting Dai**, and Xiaohui Gu, "TScope: Automatic Timeout Bug Identification for Server Systems", Proc. of IEEE International Conference on Autonomic Computing (**ICAC**), Trento, Italy, September, 2018.
6. **Ting Dai**, Daniel Dean, Peipei Wang, Xiaohui Gu, and Shan Lu, "Hytrace: A Hybrid Approach to Performance Bug Diagnosis in Production Cloud Infrastructures", IEEE Transactions on Parallel and Distributed Systems (**TPDS**), 2018.
7. **Ting Dai**, Jingzhu He, Xiaohui Gu, and Shan Lu, "Understanding Real-World Timeout Problems in Cloud Server Systems", Proc. of IEEE International Conference on Cloud Engineering (**IC2E**), Orlando, FL, April, 2018 (**best paper nominee**).
8. **Ting Dai**, Daniel Dean, Peipei Wang, Xiaohui Gu, and Shan Lu, "Hytrace: A Hybrid Approach to Performance Bug Diagnosis in Production Cloud Infrastructures", Proc. of ACM Symposium on Cloud Computing (**SoCC**), poster session, Santa Clara, CA, September, 2017.

Selected Professional Services

- **Conference/Journal Review**: ICAC 2019, APSys 2018, IC2E 2018, TPDS 2017.
- **Teaching Assistant**: Advanced Distributed Systems(Spring 2019), Discrete mathematics (Fall 2017, Spring 2018).

Selected Awards

- Travel Grant, OSDI'18, SoCC'18, SoCC'17.
- Outstanding Master Award & Outstanding Postgraduate Dissertation Award 2014, China.
- National Scholarship for Postgraduate Students, 2012, 2013, China.
- Star of the Academy Award, 2012, 2013, China.
- The 2nd Prize in National Postgraduate Mathematical Contest in Modeling, 2012, China.
- The 2nd Prize in National College and Univ. Contest of Computer Courseware, 2012, China.
- The 3rd Prize in the 12th "Challenge Cup" Science and Technology Contest, 2011, China.
- Outstanding Bachelor Award & Outstanding Undergraduate Dissertation Award, 2011, China.
- The Best Student Award, 2008, 2009, 2010, China.