Ennan Zhai

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Research Interests

Distributed Systems, Security & Privacy, Programming Languages, and Verification

Academic Positions

2017–present **Associate Research Scientist**, *Yale University*, New Haven, CT, USA.
Research areas: Distributed systems, security & privacy, programming languages, and verification

2016 **Postdoctoral Researcher**, *Yale University*, New Haven, CT, USA.
Research areas: Programming languages and verification
Advisor: Ruzica Piskac

Education

2011–2015 **Ph.D. Computer Science**, *Yale University*, New Haven, CT, USA.
Thesis title: *A Flexible Architecture for Auditing the Structural Reliability of the Clouds*
Advisor: Bryan Ford

2007–2010 **M.E. Software Engineering**, *Peking University*, Beijing, China.

2003–2007 **B.S. Software Engineering**, *Northeastern University*, Shenyang, China.

Refereed Conference Publications

FAST'18 He Xiao, Zhenhua Li, **Ennan Zhai**, Tianyin Xu, Yang Li, Yongle Wang, Quanlu Zhang, and Yao Liu. Towards Web-based Delta Synchronization for Cloud Storage Services. *USENIX Conference on File and Storage Technologies*, 2018.

OOPSLA'17 **Ennan Zhai**, Ruzica Piskac, Ronghui Gu, Xun Lao, and Xi Wang. An Auditing Language for Preventing Correlated Failures in the Cloud. *ACM International Conference on Object-Oriented Programming, Systems, Languages, and Applications*, 2017.

OOPSLA'17 Mark Santolucito, **Ennan Zhai**, Rahul Dhodapkar, Aaron Shim, and Ruzica Piskac. Synthesizing Configuration File Specifications with Association Rule Learning. *ACM International Conference on Object-Oriented Programming, Systems, Languages, and Applications*, 2017.

VLDB'17 **Ennan Zhai**, Zhenhua Li, Zhenyu Li, Fan Wu, and Guihai Chen. Resisting Tag Spam by Leveraging Implicit User Behaviors. *International Conference on Very Large Data Bases*, 2017.

FMCAD'17 William Hallahan, **Ennan Zhai**, and Ruzica Piskac. Automated Repair By Example for Firewalls. *Formal Methods in Computer Aided Design*, 2017.

NSDI'16 **Ennan Zhai**, David Isaac Wolinsky, Ruichuan Chen, Ewa Syta, Chao Teng, and Bryan Ford. AnonRep: Towards Tracking-Resistant Anonymous Reputation. *USENIX Symposium on Networked Systems Design and Implementation*, 2016.

CAV'16 Mark Santolucito, **Ennan Zhai**, and Ruzica Piskac. Probabilistic Automated Language Learning for Configuration Files. *International Conference on Computer Aided Verification*, 2016.

OSDI'14 **Ennan Zhai**, Ruichuan Chen, David Isaac Wolinsky, and Bryan Ford. Heading Off Correlated Failures through Independence-as-a-Service. *USENIX Symposium on Operating Systems Design and Implementation*, 2014.

P2P'09 **Ennan Zhai**, Ruichuan Chen, Zhuhua Cai, Long Zhang, Eng Keong Lua, Huiping Sun, Sihan Qing, and Zhong Chen. Sorcery: Could We Make P2P Content Sharing Systems Robust to Deceivers? *IEEE International Conference on Peer-to-Peer Computing*, 2009. **Outstanding Paper Award**.

[Full conference publication list available at: DBLP (`https://goo.gl/HjLwUU`)]

Refereed Workshop Publications

NetPL'17 **Ennan Zhai** and Ruzica Piskac. Towards An Auditing Language Framework for Preventing Cascading Failures. *ACM SIGCOMM Workshop on Networking and Programming Languages*, 2017.

HotStorage'17 He Xiao, Zhenhua Li, **Ennan Zhai**, and Tianyin Xu. Practical Web-based Delta Synchronization for Cloud Storage Services. *USENIX Workshop on Hot Topics in Storage and File Systems*, 2017.

HotDep'13 **Ennan Zhai**, Ruichuan Chen, David Isaac Wolinsky, and Bryan Ford. An Untold Story of Redundant Clouds: Making Your Service Deployment Truly Reliable. *Workshop on Hot Topics in Dependable Systems*, 2013.

Technical Reports/ePrint Archive

Ludovic Barman, Italo Dacosta, Mahdi Zamani, **Ennan Zhai**, Bryan Ford, Jean-Pierre Hubaux, and Joan Feigenbaum. PriFi: A Low-Latency Local-Area Anonymous Communication Network. Available at: `https://arxiv.org/abs/1710.10237`.

Ennan Zhai, David Isaac Wolinsky, Hongda Xiao, Hongqiang Liu, Xueyuan Su, and Bryan Ford. Auditing the Structural Reliability of the Clouds. Available at: `http://cpsc.yale.edu/sites/default/files/files/tr1479.pdf`.

Papers in Submission

Ennan Zhai, Ruzica Piskac, Mahesh Balakrishnan, Ruichuan Chen, Song Bo, and Haoliang Zhang. CloudCanary: Preventing Correlated Failures via Snap-Audit.

Ennan Zhai, Zhenhua Li, Jiang Ming, William Dower, and Cameron Yick. Proactive Auditing of Cascading Vulnerabilities across Inter-Cloud Replications.

Teaching Experience

Fall 2017 **Instructor**, *Building Distributed Systems*, Yale.

Fall 2016 **Teaching Assistant**, *Database Systems (Instructor: Avi Silberschatz)*, Yale.

Spring 2016 **Teaching Assistant**, *Operating Systems (Instructor: Avi Silberschatz)*, Yale.

Fall 2015 **Teaching Assistant**, *Software Analysis and Verification (Instructor: Ruzica Piskac)*, Yale.

Spring 2015 **Teaching Assistant**, *Software Engineering (Instructor: Ruzica Piskac)*, Yale.

Spring 2015 **Co-Instructor**, *Advanced Systems Topics*, Yale.

Fall 2014 **Teaching Assistant**, *Building Distributed Systems (Instructor: Bryan Ford)*, Yale.

Spring 2014 **Teaching Assistant**, *Distributed Systems Theory (Instructor: James Aspnes)*, Yale.

Fall 2013 **Teaching Assistant**, *Building Distributed Systems (Instructor: Bryan Ford)*, Yale.

Spring 2013 **Teaching Assistant**, *Data Structures and Programming (Instructor: Stanley Eisenstat)*, Yale.

Fall 2012 **Teaching Assistant**, *Building Distributed Systems (Instructor: Bryan Ford)*, Yale.

Professional Activities

Conference Program Committee Member:
- ○ ACM Symposium on Cloud Computing (SoCC), 2017, 2018.
- ○ International Conference on Networked Systems (NETYS), 2018.
- ○ SIGCOMM HotConNet Workshop, 2017.
- ○ ACM Symposium on Principles and Practice of Parallel Programming Artifact Evaluation (PPoPP AEC), 2016.
- ○ IEEE Consumer Communications and Networking Conference (CCNC), 2010.

Conference Reviewer:
- ○ European Symposium on Programming (ESOP), 2017.
- ○ International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2017.
- ○ ACM Conference on Computer and Communications Security (CCS), 2012.
- ○ IEEE International Conference on Computer Communication Network (ICCCN), 2011.

Journal Reviewer:
- ○ ACM Transactions on Privacy and Security (formerly TISSEC), 2017
- ○ IEEE Transactions on Information Forensics & Security (TIFS), 2017
- ○ IEEE/ACM Transactions on Networking (ToN), 2016
- ○ IEEE Transactions on Dependable and Secure Computing (TDSC), 2016
- ○ Journal on Peer-to-Peer Networking and Applications (PPNA), 2012-2016

Grants

IARPA Designing and Implementing Performant and Usable Privacy-Preserving Systems (PUPS). **Key Personnel** (with Kevin Butler (PI), Patrick Traynor, Thomas Shrimpton, Michelle Mazurek, and Ruzica Piskac). $9,300,021, 5 years. Under review.

NSF CCF-1715387 ConfigV: Automated Verification of Configuration Files. **Contributor** (with Ruzica Piskac (PI)). $499,295, Sep 2017– Aug 2020.

Academic Talks

Towards An Auditing Language for Preventing Correlated Failures
- ○ NetPL'17 Workshop co-localized with SIGCOMM'17 (Aug, 2017)
- ○ New York University (Apr, 2017)

Towards Tracking-Resistant Anonymous Reputation
- ○ New England Networking and Systems Day (Dec 2017)
- ○ New England Security Day (Nov 2016)
- ○ NSDI (Mar 2016)
- ○ EPFL (Mar 2015)
- ○ Yale Security Seminar (Feb 2015)

Heading Off Correlated Failures in the Cloud
- ○ Yale Network Seminar (Oct 2016)
- ○ New England Networking and Systems Day (Oct 2016)
- ○ OSDI (Oct 2014)

Awards and Honors

- ○ **Graduate Fellowship**, Yale, 2011.

○ **Outstanding Master Thesis Award**, 2010.
○ **Outstanding Paper Award**, IEEE P2P Computing (IEEE P2P), 2009.
○ **Adobe Scholarship**, 2008.

Mentoring

2015–Present **William Hallahan**, *PhD Student*, Yale University.
Project: Automated repair by example for firewalls
Publication: FMCAD'17

2015–Present **Mark Santolucito**, *PhD Student*, Yale University.
Project: Software configuration verification
Publication: CAV'16 and OOPSLA'17

2017 **Xun Lao**, *Master Student*, Yale University, currently at VMware.
Project: A language framework for auditing the cloud systems
Publication: OOPSLA'17

2017 **Xi Wang**, *Master Student*, Yale University, currently at Amazon.
Project: A language framework for auditing the cloud systems
Publication: OOPSLA'17

2017 **Cameron Yick**, *Undergraduate Student*, Yale University, currently at Enigma Technologies.
Project: Auditing the independence of cascading vulnerabilities across inter-cloud replication
Paper under review

2017 **William Dower**, *Undergraduate Student*, Yale University, currently at IBM.
Project: Auditing the independence of cascading vulnerabilities across inter-cloud replication
Paper under review

2016 **Bo Song**, *Master Student*, Yale University, currently at Google.
Project: Preventing correlated failures via snap-audit
Paper under review

2016 **Haoliang Zhang**, *Master Student*, Yale University, currently at Google.
Project: Preventing correlated failures via snap-audit
Paper under review

2015 **Chao Teng**, *Master Student*, Yale University, currently at Facebook.
Project: Tracking-resistant anonymous reputation system
Publication: NSDI'16

References

Prof. Bryan Ford
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Computer Science
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Prof. Avi Silberschatz
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