Ennan Zhai

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Research Interests

Systems, security & privacy, programming languages and verification

Education

2011–2015 **Ph.D. Computer Science**, *Yale University*, New Haven, CT, USA.
Thesis: *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.

Research Positions

2017-present **Associate Research Scientist**, *Yale University*, New Haven, CT.
Worked with Ruzica Piskac and Mahesh Balakrishnan to build a system preventing cloud-scale correlated failures, and worked with Joan Feigenbaum and Bryan Ford to build the first low-latency and tracking-resistant anonymous communication systems [CoRR'17].

2016 **Postdoctoral Researcher**, *Yale University*, New Haven, CT.
Worked with Ruzica Piskac to develop a domain-specific auditing language framework for reasoning about the structural reliability of the clouds [OOPSLA'17a], and an automatic verification framework for software configuration [OOPSLA'17b, CAV'16] as well as network misconfiguration repair [FMCAD'17].

2012-2015 **Research Assistant**, *Yale University*, New Haven, CT.
Worked with Bryan Ford to build a flexible architecture for auditing the structural reliability of the clouds [OSDI'14], and the first practical tracking-resistant anonymous reputation system [NSDI'16].

Selected Publications

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.

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.

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.

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.

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.

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

Middleware'17 Zhen Lu, Zhenhua Li, Jian Yang, Tianyin Xu, **Ennan Zhai**, Yao Liu, and Christo Wilson. Accessing Google Scholar under Extreme Internet Censorship: A Legal Avenue. *18th ACM/IFIP/USENIX International Middleware Conference*, 2017.

INFOCOM'17 Fan Dang, Pengfei Zhou, Zhenhua Li, **Ennan Zhai**, Aziz Mohaisen, Qingfu Wen, and Mo Li. Large-Scale Invisible Attack on AFC Systems with NFC-Equipped Smartphones. *IEEE International Conference on Computer Communications*, 2017.

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

INFOCOM'16 Thierry Titcheu, **Ennan Zhai**, Zhenhua Li, Yong Cui, and Kui Ren. On the Synchronization Bottleneck of OpenStack Swift-Like Cloud Storage Systems. *IEEE International Conference on Computer Communications*, 2016.

CODASPY'16 John Maheswaran, Daniel Jackowitz, **Ennan Zhai**, David Isaac Wolinsky, and Bryan Ford. Building Privacy-Preserving Cryptographic Credentials from Federated Online Identities. *ACM Conference on Data and Application Security and Privacy*, 2016.

Technical Reports/ePrint Archive

CoRR'17 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`.

Yale-TR'13 **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`.

Professional Activities

Conference service
- PC member, International Conference on Networked Systems (NETYS), 2018
- PC member, ACM Symposium on Cloud Computing (SoCC), 2017.
- PC member, SIGCOMM HotConNet Workshop, 2017.
- Reviewer, European Symposium on Programming (ESOP), 2017.
- Reviewer, International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2017.
- PC member, International Conference on Distributed Computing and Internet Technology (ICDCIT), 2018, 2017.
- PC member, ACM Symposium on Principles and Practice of Parallel Programming Artifact Evaluation (PPoPP AEC), 2016.
- Reviewer, IEEE International Conference on Computer Communication Network (ICCCN), 2011.

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

Teaching Experience

Fall 2017 **Instructor**, *Building Distributed Systems (36 Students)*, 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.
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.

Selected Talks

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

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

Towards Tracking-Resistant Anonymous Reputation
- New England Security Day (Nov 2016)
- NSDI (Mar 2016)
- EPFL (Mar 2015)
- Yale Security Seminar (Feb 2015)

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

- Bill Hallahan (Yale Ph.D., 2015-present)
- Mark Santolucito (Yale Ph.D., 2015-present)
- Xun Lao (Yale M.S., Spring 2017), now at VMware
- Xi Wang (Yale M.S., Spring 2017), now at Amazon
- Cameron Yick (Yale B.S., Spring 2017), now at Enigma Technologies
- William Dower (Yale B.S., Spring 2017), now at IBM
- Bo Song (Yale M.S., Spring 2016) now at Google
- Haoliang Zhang (Yale M.S., Spring 2016), now at Google
- Chao Teng (Yale M.S., Spring 2015), now at Facebook