

# Yuzhe Tang

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## Academic Appointments

2022 - Associate Professor, Department of EECS, Syracuse University  
2014 - 2022 Assistant Professor, Department of EECS, Syracuse University

## Education

Ph.D. *Georgia Institute of Technology* (Atlanta, GA USA), 2009-2014  
M.Sc. *Fudan University* (Shanghai, China), 2006-2009  
B.Sc. *Fudan University* (Shanghai, China), 2002-2006

## Research Interests

I am broadly interested in cyber-security and distributed systems. My current research focuses on distributed systems security and efficiency, in emerging/evolving infrastructures and applications such as blockchains, web infrastructures, cloud computing, etc. My research tackles the fundamental design tradeoff between security and performance. On the one hand, I analyze and measure large-scale deployed systems to identify, verify, and mitigate vulnerabilities. On the other hand, I optimize performance and build middlewares on security-centric systems.

## Publications

- Underline indicates students advised by Dr. Yuzhe Tang

**CCS 21** *DETER: Denial of Ethereum's Txpool-based services*  
Kai Li, Yibo Wang, Yuzhe Tang  
ACM Conference on Computer and Communications Security (CCS) 2021

**IMC 21** *TopoShot: Uncovering Ethereum's Network Topology Leveraging Replacement Transactions*  
Kai Li, Yuzhe Tang, Jiaqi Chen, Yibo Wang, Xianghong Liu  
ACM Internet Measurement Conference (IMC) 2021  
Acceptance rate=28%

**NDSS 21** *As Strong As Its Weakest Link: How to Break Blockchain DApps at RPC Service*  
Kai Li, Jiaqi Chen, Xianghong Liu, Yuzhe Tang, XiaoFeng Wang, Xiapu Luo  
The Network and Distributed System Security Symposium (NDSS) 2021  
Acceptance rate=15.2%

**FSE 21** *iBatch: Saving Ethereum Fees via Secure and Cost-Effective Batching of Smart-Contract Invocations*  
Yibo Wang, Qi Zhang, Kai Li, Yuzhe Tang, Jiaqi Chen, Xiapu Luo, Ting Chen  
ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2021  
Acceptance rate=24.5%

Middleware 21i *Authenticated Key-Value Stores with Hardware Enclaves*  
Yuzhe Tang, Kai Li, Qi Zhang, Jianliang Xu, Ju Chen  
ACM/IFIP Middleware 2021 (Industrial track)

ToNSE 21 *VFChain: Enabling Verifiable and Auditable Federated Learning via Blockchain Systems*  
Zhe Peng, Jianliang Xu, Xiaowen Chu, Shang Gao, Yuan Yao, Rong Gu, Yuzhe Tang  
IEEE Transactions on Network Science and Engineering (ToNSE) 2021

**Middleware 20** *Cost-Effective Data Feeds to Blockchains via Workload-Adaptive Data Replication*  
Kai Li, Yuzhe Tang, Jiaqi Chen, Zhehu Yuan, Cheng Xu, Jianliang Xu  
ACM/IFIP Middleware conference 2020  
Acceptance rate=25.2%

SERIAL 20 *Scalable Log Auditing on Private Blockchains via Lightweight Log-Fork Prevention*  
Yuzhe Tang, Kai Li, Yibo Wang, Sencer Burak Somuncuoglu  
Workshop on Scalable and Resilient Infrastructures for Distributed Ledgers 2020, co-located with ACM/IFIP Middleware conference 2020

**ICDE 19** *GEM<sup>2</sup>-Tree: A Gas-Efficient Structure for Authenticated Range Queries in Blockchain*

	Ce Zhang, Cheng Xu, Jianliang Xu, Yuzhe Tang, Byron Choi IEEE 36th International Conference on Data Engineering (ICDE) 2020 Acceptance rate=26.8%
SComm 19	<i>Secure Consistency Verification for Untrusted Cloud Storage by Public Blockchains</i> <u>Kai Li</u> , Yuzhe Tang, Beom Heyn Kim, Jianliang Xu SecureComm 2019
SComm 19	<i>Authenticated LSM Trees with Minimal Trust</i> Yuzhe Tang, <u>Ju Chen</u> , <u>Kai Li</u> SecureComm 2019 (Short paper)
CISSE 19	<i>Hands-on Labs for Secure Programming on Modern Trusted Platforms</i> Yuzhe Tang, Wenliang Du The Colloquium For Information Systems Security Education, 2019
ASONAM 19p	<i>Computing Node Clustering Coefficients Securely</i> K. Areekijserree, Yuzhe Tang, Sucheta Soundarajan IEEE ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM), 2019 (Poster paper)
SComm 18	<i>Secure and Efficient Multi-Party Directory Publication for Privacy-Preserving Data Sharing</i> <u>K. Areekijserree</u> , <u>Ju Chen</u> , Yuzhe Tang, Shuang Wang, Arun Iyengar and B. Palanisamy SecureComm 2018, Acceptance rate=30.6%
Cloud 18	<i>ChainFS: Blockchain-Secured Cloud Storage</i> <u>Qiwu Zou</u> , Yuzhe Tang, <u>Ju Chen</u> , <u>Kai Li</u> , Charles Kamoua, Kevin Kwiat, Laurent Njilla IEEE Cloud 2018, Acceptance rate=20%
Cloud 18	Pinchao Liu, Liting Hu, Hailu Xu, Zhiyuan Shi, Jason Liu, Qingyang Wang, Jai Dayal and Yuzhe Tang <i>A Toolset for Detecting Containerized Application's Dependencies in CaaS Clouds</i> IEEE Cloud 2018, Acceptance rate=20%
Cloud 18	Hailu Xu, Liting Hu, Pinchao Liu, Yao Xiao, Wentao Wang, Jai Dayal, Qingyang Wang and Yuzhe Tang <i>Oases: An Online Scalable Spam Detection System for Social Networks</i> IEEE Cloud 2018, Acceptance rate=20%
FC 18w	<i>Lightweight Blockchain Logging for Data-Intensive Applications</i> Yuzhe Tang, <u>Zihao Xing</u> , <u>Cheng Xu</u> , <u>Ju Chen</u> , Jianliang Xu The Workshop of Trusted Smart Contract at the International Conference of Financial Cryptography 2018
VT 18	<i>Non-interactive Identity-based Underwater data transmission with Anonymity and Zero-knowledge</i> Changsheng Wan, Vir V Phoha, Yuzhe Tang, Aiqun Hu IEEE Transactions on Vehicular Technology 2017
CIC 17	<i>PADS: Privacy-preserving Auction Design for Allocating Dynamically Priced Cloud Resources</i> Jinlai Xu, Balaji Palanisamy, Yuzhe Tang, SD Madhu Kumar IEEE CIC 2017
SOSP 17w	<i>Strongly Secure and Efficient Data Shuffle on Hardware Enclaves</i> <u>Ju Chen</u> , Yuzhe Tang, Hao Zhou The Workshop of Systems Software for Trusted Execution (SysTEX) at ACM SOSP 2017
ICDCS 17p	<i>Towards Secure Public Directory for Privacy-Preserving Data Sharing</i> <u>Amin Fallahi</u> , Xi Liu, Yuzhe Tang, Shuang Wang, Rui Zhang IEEE International Conference on Distributed Computing Systems, Poster
ICDCS 17w	<i>Social-Aware Decentralization for Efficient and Secure Multi-Party Computation</i> Yuzhe Tang, Sucheta Soundarajan The Workshop of Big-Data Privacy and Security at IEEE International Conference on Distributed Computing Systems
BMC 16	<i>Secure Multi-pArty Computation Grid LOGistic REgression (SMAC-GLORE)</i> <u>Haoyi Shi</u> , Chao Jiang, Wenrui Dai, Xiaoqian Jiang, Yuzhe Tang, Lucila Ohno-Machado and Shuang Wang BMC Medical Informatics and Decision Making <a href="#">[open access]</a>
SecDev 16	<i>Towards Building Practical And Secure Multi-Party Databases</i> Yuzhe Tang, <u>Wenqing Zhuang</u> IEEE Cyber-security Development Conference 2016 (Abstract)
<b>Bioinformatics 16</b>	<i>HEALER: Homomorphic computation of ExAct Logistic rEgRes-sion for secure rare disease variants analysis in GWAS</i> Shuang Wang, Y. Zhang, W. Dai, K. Lauter, M. Kim, Yuzhe Tang, X. Jiang Oxford Journals Bioinformatics, doi: 10.1093/bioinformatics/btv563
BMC 15	<i>Privacy-preserving GWAS analysis on federated genomic datasets</i> <u>Scott D Constable</u> , Yuzhe Tang, Shuang Wang, Xiaoqian Jiang, Steve Chapin BMC Medical Informatics and Decision Making 2015, <a href="#">[Open access]</a>
<b>TKDE 15</b>	<i>Privacy-Preserving Multi-Keyword Search in Information Networks</i> Yuzhe Tang, Ling Liu IEEE Trans. Knowl. Data Eng. 27(9): 2424-2437 (2015)

CCGrid 15	<i>Deferred Lightweight Indexing for Log-Structured Key-Value Stores</i> Yuzhe Tang, Arun Iyengar, Wei Tan, Liana Fong, Ling Liu, Balaji Palanisamy IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing 2015: 11-20 <b>Best Paper Award</b>
HPBDC 15	<i>KTV Tree: Interactive Top-K Aggregation on Large Dataset in Cloud</i> Yuzhe Tang, Ling Liu, Junichi Tatemura, Hakan Hacigumus IEEE International Conference of Distributed Computing Systems Workshops 2015: 136-141
HotCloud 15	<i>Privacy-Preserving Offloading of Mobile App to the Public Cloud</i> Yue Duan, Mu Zhang, Heng Yin, Yuzhe Tang USENIX Workshop on Hot Topics in Cloud Computing 2015 Acceptance rate=32.8%
TBC 15	<i>Secure Multi-party Computation on Grid Logistic Regression</i> Haoyi Shi, Shuang Wang, Wenrui Dai, Yuzhe Tang, Xiaoqian Jiang, Lucila Ohno-Machado Annual Translational Bioinformatics Conference 2015
<b>ACSAC 14</b>	<i>Lightweight Authentication of Freshness in Outsourced Key-Value Stores</i> Yuzhe Tang, Ling Liu, Xin Hu, Jiyong Jang USENIX/ACM Annual Computer Security Applications Conference 2014: 176-185 Acceptance rate=19.9%
<b>ICDCS 14</b>	<i>e-PPI: Locator Service in Information Networks with Personalized Privacy Preservation</i> Yuzhe Tang, Ling Liu, Arun Iyengar IEEE International Conference of Distributed Computing Systems 2014: 186-197 Acceptance rate=13%
<b>EDBT 14</b>	<i>Diff-Index: Differentiated Index in Distributed Log-Structured Data Stores</i> Wei Tan, Sandeep Tata, Yuzhe Tang, Liana Fong International Conference on Extending Database Technology 2014: 700-711 Acceptance rate=20%
JDPD 14	<i>Anonymizing Continuous Queries with Delay-tolerant Mix-zones on Road Networks</i> Balaji Palanisamy, Ling Liu, Kisung Lee, Shicong Meng, Yuzhe Tang International Journal of Distributed and Parallel Databases 32(1): 91-118 (2014)
ICDE 14d	<i>Outsourcing multi-version key-value stores with verifiable data freshness</i> Yuzhe Tang, Ling Liu, Ting Wang, Xin Hu, Reiner Sailer, Peter Pietzuch IEEE International Conference on Data Engineering 2014: 1214-1217 (Demo paper)
<b>TPDS 13</b>	<i>Auto-pipelining for Data Stream Processing</i> Yuzhe Tang, Bugra Gedik IEEE Trans. Parallel Distrib. Syst. 24(12): 2344-2354 (2013)
Cloud 13	<i>Residency Aware Inter-VM Communication in Virtualized Cloud: Performance Measurement and Analysis</i> Qi Zhang, Ling Liu, Yi Ren, Kisung Lee, Yuzhe Tang, Xu Zhao, Yang Zhou IEEE International Conference on Cloud Computing 2013: 204-211
Cloud 13	<i>Efficient and Customizable Data Partitioning Framework for Distributed Big RDF Data Processing in the Cloud</i> Kisung Lee, Ling Liu, Yuzhe Tang, Qi Zhang, Yang Zhou IEEE International Conference on Cloud Computing 2013: 327-334
MSN 12	<i>Location Privacy with Road Network Mix-Zones</i> Balaji Palanisamy, Ling Liu, Kisung Lee, Shicong Meng, Yuzhe Tang IEEE International Conference on Mobile Ad-hoc and Sensor Networks 2012: 124-131
Cloud 12	<i>Reliable State Monitoring in Cloud Data Centers</i> Shicong Meng, Arun Iyengar, I. Rouvellou, Ling Liu, Kisung Lee, Balaji Palanisamy, Yuzhe Tang IEEE International Conference on Cloud Computing 2012: 951-958 <b>Best Paper Award</b>
<b>CIKM 11</b>	<i>Privacy Preserving Indexing for eHealth Information Networks</i> Yuzhe Tang, Ting Wang, Ling Liu, Shicong Meng, Balaji Palanisamy Conference on Information and Knowledge Management 2011: 905-914 Acceptance rate=15% (Full paper)
<b>TPDS 11</b>	<i>A Lightweight Multi-dimensional Index for Complex Queries over DHTs</i> Yuzhe Tang, Jianliang Xu, Shuigeng Zhou, Wang-Chien Lee, Dingxiong Deng, Yue Wang IEEE Trans. Parallel Distrib. Syst. 22(12): 2046-2054 (2011)
<b>TKDE 10</b>	<i>LIGHT: A Query-Efficient yet Low-Maintenance Indexing Scheme over DHTs</i> Yuzhe Tang, Shuigeng Zhou, Jianliang Xu IEEE Trans. Knowl. Data Eng. 22(1): 59-75 (2010)
<b>ICDCS 09</b>	<i>m-LIGHT: Indexing Multi-Dimensional Data over DHTs</i> Yuzhe Tang, Jianliang Xu, Shuigeng Zhou, Wang-Chien Lee IEEE International Conference of Distributed Computing Systems 2009: 191-198 Acceptance rate=16%
<b>ICDCS 08</b>	<i>LHT: A Low-Maintenance Indexing Scheme over DHTs</i> Yuzhe Tang, Shuigeng Zhou IEEE International Conference of Distributed Computing Systems 2008: 141-151

In submission	<i>Towards Saving Blockchain Fees via Secure and Cost-Effective Batching of Smart-Contract Invocations</i> Yibo Wang, Kai Li, Yuzhe Tang, Jiaqi Chen, Qi Zhang, Xiapu Luo, Ting Chen In submission to TSE (IEEE Transactions on Software Engineering)
In submission	<i>Efficiently Hardening SGX Enclaves against Side Channels via Dynamic Program Partitioning</i> Yuzhe Tang, Kai Li, Jiaqi Chen, Yibo Wang, Cheng Xu In submission to ICSE 2022
In submission	<i>AEEP: Automated Enclave EVM Partition</i> Xi Xiao, Hanqi Zhang, Wentao Xiao, Xiapu Luo, Yuzhe Tang, Xingjun Wang In submission to ICSE 2022

## Research Funds

- Summary: Grants awarded 11, total amount (Tang's share): \$1.81M

2023-2026	CNS Core: Small: One Size doesn't Fit All: Workload-Aware Cost Optimization for Decentralized Applications on Blockchains Yuzhe Tang (Single PI), \$498,624 National Science Foundation ( <b>NSF</b> )
2022-2023	DoS-secure transaction propagation on Ethereum: Exploit generation and attack detection Yuzhe Tang (single PI), \$84,392 Ethereum Foundation
2021-2024	Collaborative Research: SaTC: EDU: Developing Instructional Laboratories for Blockchain Security Applications, Yuzhe Tang (PI), Jing Lei, Farzana Rahman, Hongmei Chi. Total: \$399,995, PI Tang's portion: \$340,000 National Science Foundation ( <b>NSF</b> )
2018-2021	SaTC: Small: External Obliviousness in Trusted Execution Environments Yuzhe Tang (Single PI), \$496,999 + \$16,000 National Science Foundation ( <b>NSF</b> )
2019-2020	Planning IUCRC Syracuse University: Center for High-Assurance Secure Systems and IoT (CHASSI) Shui-Kai Chin (PI), Yuzhe Tang (Co-PI), \$15,000 National Science Foundation ( <b>NSF</b> )
2018-2020	SGX-based Key-Management Applications in the Cloud Yuzhe Tang (Single PI), \$9,996 Intel Gift
2017-2018	Cryptographic Engineering on Modern Trusted Platforms Yuzhe Tang (PI), Wenliang Du (Co-PI), \$300,000 National Security Agency ( <b>NSA</b> )
2017-2017	Secure Multi-Party Databases by Oblivious Query Translation and Execution Yuzhe Tang (PI), \$13,200 Air Force Research Lab Visiting Faculty Research Program
2015-2016	Optimizing Privacy-Preserving Analytics in Information Networks Yuzhe Tang (PI), \$69,861 Cyber Research Institute (CRI)

### Internal Grants

2021-2023	Workload-Adaptive Designs for Cost-Effective Decentralized Applications on Blockchains Yuzhe Tang (Single PI), \$21,000, CUSE Grant (Syracuse University Internal Grant)
2018-2020	On-Campus Blockchain Applications for Education and Beyond Wenliang Du (PI), Yuzhe Tang (Co-PI), \$30,000 CUSE Grant (Syracuse University Internal Grant)
2018-2020	Efficient Algorithms for Secure, Large-Scale Graph Mining Yuzhe Tang (PI), Sucheta Soundarajan (Co-PI), \$30,000 CUSE Grant (Syracuse University Internal Grant)

## Patents

2015	Adaptive Auto-pipelining in Stream Processing Applications Bugra Gedik, Scott A. Schneider, Yuzhe Tang, Kun-lung Wu US patent granted (US9098350B2)
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## Teaching

Fall 2021	CIS629/FIN629, <i>Blockchain Foundation and Applications</i>
Fall 2020	CIS600/FIN600, <i>Cryptocurrencies and Blockchains</i>
Fall 2019	CIS600/FIN600, <i>Cryptocurrencies and Blockchains</i> CIS628/CIS428, <i>Introduction to Applied Cryptography</i>
Spring 2019	CSE384, <i>System Programming</i>
Fall 2018	CIS600/FIN600, <i>Blockchain and Cryptocurrency</i>
Spring 2018	CIS300, <i>Introduction to System Programming</i>
Fall 2017	CIS700, <i>Modern Information Security and Privacy</i>
Spring 2017	CIS/CSE600, <i>Applied Cryptography</i> CIS655/CSE661, <i>Advanced Computer Architecture</i> CIS423, <i>System Programming</i>
Spring 2016	CIS700/CSE791, <i>Big-Data and Cloud Security</i> , website: <a href="#">[link]</a>
Fall 2015	CIS655/CSE661, <i>Advanced Computer Architecture</i> , website: <a href="#">[link]</a>
Spring 2015	CIS700/CSE791, <i>Distributed Systems in Cloud</i> , website: <a href="#">[link]</a>
Fall 2014	CIS655/CSE661, <i>Advanced Computer Architecture</i> (180 students)

## Advising

### Ph.D. students

- Yibo Wang: *FSE'21 (1st author)*, *IMC'21* (co-author)
- Jiaqi Chen: *NDSS'21*, *IMC'21*, *FSE'21*, *Middleware'20* (co-author)
- Xianghong Liu: *NDSS'21*, *IMC'21* (co-author)
- Yuxuan Zhou
- Wanning Ding

### Undergraduate students (REU)

- Eniola Mosaku, Jack Willis, Nicholas Sweet, Mingyan Zhang

### Alumni

- Dr. Kai Li, Tenure-track Assistant Professor in CS dept. at San Diego State Univ. (joining Fall 2022).
  - Papers (during Ph.D.): *CCS'21 (1st author)*, *IMC'21 (1st author)*, *NDSS'21 (1st author)*, *Middleware'20 (1st author)*.
  - Internships: IBM Research '20, Amazon '21
  - Award: NortonLife Ph.D. fellowship finalist '22
- M.Sc.: Vinutha Karanth (Microsoft), Sencer Burak Somuncuoglu (Chainalysis), Kang Lou, Katchaguy Areekijseree (PhD at Syracuse Univ.), Hari Krishna Gajarla (Bloomberg)
- B.Sc. (including REU): Zhehu Yuan (Ph.D. at NYU), Qiwu Zou (Cornell Univ.), Congcong Xie (NYU, then Oracle), Adam Piekarski, Jeong Bin Oh (A database startup), Sharell Scott (Google)
- Visiting scholar: Cheng Xu (Postdoc at Simon Fraser Univ.)

## Professional Services

Program chair	Great Lake Security Day (GLSD 20/18) The International Workshop of Blockchain and Data Management (BlockDM) 21/20/19 (co-located with ICDE)
Program committee	WWW (21/20), ICDCS (20/17/15), IPDPS 18, ICICS (22/21), IEEE Cloud 15, PAIS (16/15) TOCS 17, TKDE (17/16/15), TSC (21/17/16/15), IEEE Computing 17, TWeb 15, TCSVT 14

## Internship Experience

05/2013-08/2013	IBM Research (T.J. Watson Lab) at Yorktown Heights, NY USA
05/2012-08/2012	IBM Research (T.J. Watson Lab) at Yorktown Heights, NY USA
05/2011-08/2011	IBM Research (T.J. Watson Lab) at Hawthorn, NY USA
05/2010-08/2010	NEC Labs America at Cupertino, CA USA
01/2009-06/2009	Microsoft Research Asia at Beijing, China
01/2006-04/2006	IBM Corp. at Shanghai, China

## Honors and Awards

- Air Force Research Lab (AFRL) Visiting Faculty Research Award, 2017
- Best paper award, 15th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing, 2015
- Chinese Government Award for Outstanding Self-financed Students Abroad, 2012
- Best paper award, 5th International Conference on Cloud Computing, 2012
- Outstanding Master Thesis of Shanghai, Shanghai Government, 2010



- Tung's Oriental Scholarship, Tung's Oriental, 2008
- HP Distinguished Chinese Student Scholarship, Hewlett-Packard, 2008
- ICDCS Student Travel Grant, TCDP (IEEE Computer Society), 2008
- Graduate Student Fellowship of Fudan University, 2007-2008 (2 times)
- Outstanding Graduated Student of Fudan University, 2006
- Excellence Award, Tencent Innovation Contest, 2006
- The Peoples Scholarship of Fudan University, 2002-2006 (4 times)
- Chinese Physics Olympiads, First Prize in Hunan Province, 2001

## Invited Talks

### *Research talks*

- Blockchain communication security and efficiency
  - Ohio State University ('21), University of Louisiana at Lafayette ('21)
- DETER: Denial of Ethereum Txpool Service
  - Consensus day '21
- Lightweight Data Authentication in Outsourced Key-Value Stores
  - Cornell University ('17), Xi'an Jiao Tong University ('17), Fudan University ('16), Louisiana State University ('14)
- Searching HIE with Differentiated Privacy Preservation
  - HealthTech '14, colocated with USENIX Security, San Diego, CA
- Scalable and secure cloud service in big data systems
  - University of Delaware ('14), North Kentucky University ('14), NEC Lab ('14), IBM Research ('14), Missouri University of Science and Technology

### *Panel*

- Blockchain Database, VLDB '21 panel [\[link\]](#).

### *Lectures to the general public*

- Public lecture: "Get Your Head In The Clouds! Cloud Computing: Risks and Rewards"
  - TACNY Junior Cafe Scientifique, Museum of Science & Technology, Syracuse ('17)
  - NSBE (National Society of Black Engineers) Jr. Science Camp. hosting Grades 7 - 12 in Syracuse City School District ('17)
- Public lecture: "Blockchain: Applications, Security Promises and Internals"
  - CSIAC ('17), Syracuse University Alumni Event ('21)