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

Broadly interested in cyber-security, systems, software engineering, and system measurement. His cyber-security research covers vulnerability discovery, attack detection, attack mitigation, and measurement of deployed systems.

Current research focuses on blockchain security, blockchain systems, blockchain applications, and blockchain education. He has worked on confidential computing, trusted execution environments, and cloud security.

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 (**NSF**)
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 (**NSF**)
2018-2021	SaTC: Small: External Obliviousness in Trusted Execution Environments Yuzhe Tang (Single PI), $496,999 + $16,000 National Science Foundation (**NSF**)
2019-2020	Planning IUCRC Syracuse University: Center for High-Assurance Secure Systems and IoT (CHASSI) Shui-Kai Chin, Yuzhe Tang (Co-PI), $15,000 National Science Foundation (**NSF**)
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, $300,000 National Security Agency (**NSA**)
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)

Publications

- <u>Underline</u> indicates students advised by Dr. Yuzhe Tang

CCS 21
DETER: Denial of Ethereum's Txpool-basEd seRvices
<u>Kai Li</u>, <u>Yibo Wang</u>, Yuzhe Tang
ACM Conference on Computer and Communications Security (CCS) 2021

IMC 21
TopoShot: Uncovering Ethereum's Network Topology Leveraging Replacement Transactions
<u>Kai Li</u>, Yuzhe Tang, <u>Jiaqi Chen</u>, <u>Yibo Wang</u>, <u>Xianghong Liu</u>
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
<u>Kai Li</u>, <u>Jiaqi Chen</u>, <u>Xianghong Liu</u>, 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
<u>Yibo Wang</u>, <u>Qi Zhang</u>, <u>Kai Li</u>, Yuzhe Tang, <u>Jiaqi Chen</u>, 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, <u>Kai Li</u>, Qi Zhang, Jianliang Xu, <u>Ju Chen</u>
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
<u>Kai Li</u>, Yuzhe Tang, <u>Jiaqi Chen</u>, <u>Zhehu Yuan</u>, <u>Cheng Xu</u>, 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, <u>Kai Li</u>, <u>Yibo Wang</u>, <u>Sencer Burak Somuncuoglu</u>
Workshop on Scalable and Resilient Infrastructures for Distributed Ledgers 2020, co-located with ACM/IFIP Middleware conference 2020

ICDE 19
GEM^2-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
Secure Consistency Verification for Untrusted Cloud Storage by Public Blockchains
<u>Kai Li</u>, Yuzhe Tang, Beom Heyn Kim, Jianliang Xu
SecureComm 2019

SComm 19
Authenticated LSM Trees with Minimal Trust
Yuzhe Tang, <u>Ju Chen</u>, <u>Kai Li</u>
SecureComm 2019 (Short paper)

CISSE 19
Hands-on Labs for Secure Programming on Modern Trusted Platformş
Yuzhe Tang, Wenliang Du
The Colloquium For Information Systems Security Education, 2019

ASONAM 19p
Computing Node Clustering Coefficients Securely
K. Areekijseree, Yuzhe Tang, Sucheta Soundarajan
IEEE ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM), 2019 (Poster paper)

SComm 18
Secure and Efficient Multi-Party Directory Publication for Privacy-Preserving Data Sharing
K. Areekijseree, <u>Ju Chen</u>, Yuzhe Tang, Shuang Wang, Arun Iyengar and B. Palanisamy
SecureComm 2018, Acceptance rate=30.6%

Cloud 18
ChainFS: Blockchain-Secured Cloud Storage

	Qiwu Zou, Yuzhe Tang, Ju Chen, Kai Li, 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 *A Toolset for Detecting Containerized Application's Dependencies in CaaS Clouds* 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 *Oases: An Online Scalable Spam Detection System for Social Networks* IEEE Cloud 2018, Acceptance rate=20%
FC 18w	*Lightweight Blockchain Logging for Data-Intensive Applications* Yuzhe Tang, Zihao Xing, Cheng Xu, Ju Chen, Jianliang Xu The Workshop of Trusted Smart Contract at the International Conference of Financial Cryptography 2018
VT 18	*Non-interactive Identity-based Underwater data transmission with Anonymity and Zero-knowledge* Changsheng Wan, Vir V Phoha, Yuzhe Tang, Aiqun Hu IEEE Transactions on Vehicular Technology 2017
CIC 17	*PADS: Privacy-preserving Auction Design for Allocating Dynamically Priced Cloud Resources* Jinlai Xu, Balaji Palanisamy, Yuzhe Tang, SD Madhu Kumar IEEE CIC 2017
SOSP 17w	*Strongly Secure and Efficient Data Shuffle on Hardware Enclaves* Ju Chen, Yuzhe Tang, Hao Zhou The Workshop of Systems Software for Trusted Execution (SysTEX) at ACM SOSP 2017
ICDCS 17p	*Towards Secure Public Directory for Privacy-Preserving Data Sharing* Amin Fallahi, Xi Liu, Yuzhe Tang, Shuang Wang, Rui Zhang IEEE International Conference on Distributed Computing Systems, Poster
ICDCS 17w	*Social-Aware Decentralization for Efficient and Secure Multi-Party Computation* Yuzhe Tang, Sucheta Soundarajan The Workshop of Big-Data Privacy and Security at IEEE International Conference on Distributed Computing Systems
BMC 16	*Secure Multi-pArty Computation Grid LOgistic REgression (SMAC-GLORE)* Haoyi Shi, Chao Jiang, Wenrui Dai, Xiaoqian Jiang, Yuzhe Tang, Lucila Ohno-Machado and Shuang Wang BMC Medical Informatics and Decision Making [open access]
SecDev 16	*Towards Building Practical And Secure Multi-Party Databases* Yuzhe Tang, Wenqing Zhuang IEEE Cyber-security Development Conference 2016 (Abstract)
Bioinfomatics 16	*HEALER: Homomorphic computation of ExAct Logistic rEgRes-sion for secure rare disease variants analysis in GWAS* Shuang Wang, Y. Zhang, W. Dai, K. Lauter, M. Kim, Yuzhe Tang, X. Jiang Oxford Journals BioInformatics, doi: 10.1093/bioinformatics/btv563
BMC 15	*Privacy-preserving GWAS analysis on federated genomic datasets* Scott D Constable, Yuzhe Tang, Shuang Wang, Xiaoqian Jiang, Steve Chapin BMC Medical Informatics and Decision Making 2015, [Open access]
TKDE 15	*Privacy-Preserving Multi-Keyword Search in Information Networks* Yuzhe Tang, Ling Liu IEEE Trans. Knowl. Data Eng. 27(9): 2424-2437 (2015)
CCGrid 15	*Deferred Lightweight Indexing for Log-Structured Key-Value Stores* 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 **Best Paper Award**
HPBDC 15	*KTV Tree: Interactive Top-K Aggregation on Large Dataset in Cloud* Yuzhe Tang, Ling Liu, Junichi Tatemura, Hakan Hacigumus IEEE International Conference of Distributed Computing Systems Workshops 2015: 136-141
HotCloud 15	*Privacy-Preserving Offloading of Mobile App to the Public Cloud* Yue Duan, Mu Zhang, Heng Yin, Yuzhe Tang USENIX Workshop on Hot Topics in Cloud Computing 2015 Acceptance rate=32.8%
TBC 15	*Secure Multi-party Computation on Grid Logistic Regression* Haoyi Shi, Shuang Wang, Wenrui Dai, Yuzhe Tang, Xiaoqian Jiang, LucilaOhno-Machado Annual Translational Bioinformatics Conference 2015
ACSAC 14	*Lightweight Authentication of Freshness in Outsourced Key-Value Stores* Yuzhe Tang, Ling Liu, Xin Hu, Jiyong Jang USENIX/ACM Annual Computer Security Applications Conference 2014: 176-185 Acceptance rate=19.9%
ICDCS 14	*e-PPI: Locator Service in Information Networks with Personalized Privacy Preservation* Yuzhe Tang, Ling Liu, Arun Iyengar

	IEEE International Conference of Distributed Computing Systems 2014: 186-197
	Acceptance rate=13%
EDBT 14	*Diff-Index: Differentiated Index in Distributed Log-Structured Data Stores*
	Wei Tan, Sandeep Tata, Yuzhe Tang, Liana Fong
	International Conference on Extending Database Technology 2014: 700-711
	Acceptance rate=20%
JDPD 14	*Anonymizing Continuous Queries with Delay-tolerant Mix-zones on Road Networks*
	Balaji Palanisamy, Ling Liu, Kisung Lee, Shicong Meng, Yuzhe Tang
	International Journal of Distributed and Parallel Databases 32(1): 91-118 (2014)
ICDE 14d	*Outsourcing multi-version key-value stores with verifiable data freshness*
	Yuzhe Tang, Ling Liu, Ting Wang, Xin Hu, Reiner Sailer, Peter Pietzuch
	IEEE International Conference on Data Engineering 2014: 1214-1217 (Demo paper)
TPDS 13	*Auto-pipelining for Data Stream Processing*
	Yuzhe Tang, Bugra Gedik
	IEEE Trans. Parallel Distrib. Syst. 24(12): 2344-2354 (2013)
Cloud 13	*Residency Aware Inter-VM Communication in Virtualized Cloud: Performance Measurement and Analysis*
	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	*Efficient and Customizable Data Partitioning Framework for Distributed Big RDF Data Processing in the Cloud*
	Kisung Lee, Ling Liu, Yuzhe Tang, Qi Zhang, Yang Zhou
	IEEE International Conference on Cloud Computing 2013: 327-334
MSN 12	*Location Privacy with Road Network Mix-Zones*
	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	*Reliable State Monitoring in Cloud Data Centers*
	Shicong Meng, Arun Iyengar, I. Rouvellou, Ling Liu, Kisung Lee, Balaji Palanisamy, Yuzhe Tang
	IEEE International Conference on Cloud Computing 2012: 951-958
	Best Paper Award
CIKM 11	*Privacy Preserving Indexing for eHealth Information Networks*
	Yuzhe Tang, Ting Wang, Ling Liu, Shicong Meng, Balaji Palanisamy
	Conference on Information and Knowledge Management 2011: 905-914
	Acceptance rate=15% (Full paper)
TPDS 11	*A Lightweight Multi-dimensional Index for Complex Queries over DHTs*
	Yuzhe Tang, Jianliang Xu, Shuigeng Zhou, Wang-Chien Lee, Dingxiong Deng, Yue Wang
	IEEE Trans. Parallel Distrib. Syst. 22(12): 2046-2054 (2011)
TKDE 10	*LIGHT: A Query-Efficient yet Low-Maintenance Indexing Scheme over DHTs*
	Yuzhe Tang, Shuigeng Zhou, Jianliang Xu
	IEEE Trans. Knowl. Data Eng. 22(1): 59-75 (2010)
ICDCS 09	*m-LIGHT: Indexing Multi-Dimensional Data over DHTs*
	Yuzhe Tang, Jianliang Xu, Shuigeng Zhou, Wang-Chien Lee
	IEEE International Conference of Distributed Computing Systems 2009: 191-198
	Acceptance rate=16%
ICDCS 08	*LHT: A Low-Maintenance Indexing Scheme over DHTs*
	Yuzhe Tang, Shuigeng Zhou
	IEEE International Conference of Distributed Computing Systems 2008: 141-151
In submission	*Towards Saving Blockchain Fees via Secure and Cost-Effective Batching of Smart-Contract Invocations*
	<u>Yibo Wang</u>, <u>Kai Li</u>, Yuzhe Tang, <u>Jiaqi Chen</u>, Qi Zhang, Xiapu Luo, Ting Chen
	In submission to TSE (IEEE Transactions on Software Engineering)
In submission	*Efficiently Hardening SGX Enclaves against Side Channels via Dynamic Program Partitioning*
	Yuzhe Tang, <u>Kai Li</u>, <u>Jiaqi Chen</u>, <u>Yibo Wang</u>, <u>Cheng Xu</u>
	In submission to ICSE 2022
In submission	*AEEP: Automated Enclave EVM Partition*
	Xi Xiao, Hanqi Zhang, Wentao Xiao, Xiapu Luo, Yuzhe Tang, Xingjun Wang
	In submission to ICSE 2022

Patents

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

Teaching

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