# **Yuzhe Tang**

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# Academic Appointments

2022 - Now 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, computer systems, and software engineering. My cyber-security research covers vulnerability discovery, attack detection, attack mitigation, and security measurement of deployed systems.

My current research focuses on blockchain security, blockchain systems, blockchain applications, and blockchain education. I have worked on confidential computing, trusted execution environments, and cloud security.

# Research Funds

Yuzhe Tang (PI), \$69,861 Cyber Research Institute (CRI)

2015-2016

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

2022-2025	CNS Core: Small: One Size doesn't Fit All: Workload-Aware Cost Optimization for
	Decentralized Applications on Blockchains
	Yuzhe Tang (Single PI), \$498,624
2022-2023	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
2021-2024	Security Applications,
	Yuzhe Tang (PI), Jing Lei, Farzana Rahman, Hongmei Chi.
	Total: \$399,995, PI Tang's portion: \$340,000
	National Science Foundation (NSF)
2018-2022	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 (PI), 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
0017 0010	Intel Gift
2017-2018	Cryptographic Engineering on Modern Trusted Platforms
	Yuzhe Tang (PI), Wenliang Du (Co-PI), \$300,000
2017-2017	National Security Agency (NSA)  Secure Multi-Party Patchages by Oblivious Quary Translation and Execution
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
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Optimizing Privacy-Preserving Analytics in Information Networks

#### 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)

# Publications

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

ConsensusDay 22 Towards the Comprehensive Understanding of Ethereum Mempool DoS Security

Yibo Wang, Kai Li, Yuzhe Tang

Consensus Day 22, Co-located with CCS 2022

CCS 21p Enabling Cost-Effective Blockchain Applications via Workload-Adaptive Transaction

Execution

Yibo Wang, Yuzhe Tang

ACM Conference on Computer and Communications Security (CCS) 2022, Poster

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

<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

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

Kai Li, Yuzhe Tang, 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, Jiagi 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^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%

SecureComm19 Secure Consistency Verification for Untrusted Cloud Storage by Public Blockchains

Kai Li, Yuzhe Tang, Beom Heyn Kim, Jianliang Xu

SecureComm 2019

SecureComm19 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 Platforms

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 Secure and Efficient Multi-Party Directory Publication for Privacy-Preserving Data Sharing SecureComm18 K. Areekijseree, Ju Chen, Yuzhe Tang, Shuang Wang, Arun Iyengar and B. Palanisamy SecureComm 2018, Acceptance rate=30.6% ChainFS: Blockchain-Secured Cloud Storage Cloud 18 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% Hailu Xu, Liting Hu, Pinchao Liu, Yao Xiao, Wentao Wang, Jai Dayal, Qingyang Wang and Cloud 18 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 **TVT 18** Non-interactive Identity-based Underwater data transmission with Anonymity and Zeroknowledge Changsheng Wan, Vir V Phoha, Yuzhe Tang, Aigun 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 Strongly Secure and Efficient Data Shuffle on Hardware Enclaves SOSP 17w 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 [ppen access] SecDev 16 Towards Building Practical And Secure Multi-Party Databases Yuzhe Tang, Wenging Zhuang IEEE Cyber-security Development Conference 2016 (Abstract) Bioinformatics 16 HEALER: Homomorphic computation of ExAct Logistic rEgRession 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] Privacy-Preserving Multi-Keyword Search in Information Networks **TKDE 15** Yuzhe Tang, Ling Liu IEEE Transaction of Knowledge and Data Engineering 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 Privacy-Preserving Offloading of Mobile App to the Public Cloud HotCloud 15 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

Lightweight Authentication of Freshness in Outsourced Key-Value Stores ACSAC 14 Yuzhe Tang, Ling Liu, Xin Hu, Jiyong Jang USENIX/ACM Annual Computer Security Applications Conference 2014: 176-185 Acceptance rate=19.9% e-PPI: Locator Service in Information Networks with Personalized Privacy Preservation **ICDCS 14** Yuzhe Tang, Ling Liu, Arun Iyengar IEEE International Conference of Distributed Computing Systems 2014: 186-197 Acceptance rate=13% Diff-Index: Differentiated Index in Distributed Log-Structured Data Stores **EDBT 14** 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 Balaii 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 Efficient and Customizable Data Partitioning Framework for Distributed Big RDF Data Cloud 13 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) A Lightweight Multi-dimensional Index for Complex Queries over DHTs **TPDS 11** Yuzhe Tang, Jianliang Xu, Shuigeng Zhou, Wang-Chien Lee, Dingxiong Deng, Yue Wang IEEE Trans. Parallel Distrib. Syst. 22(12): 2046-2054 (2011) LIGHT: A Query-Efficient yet Low-Maintenance Indexing Scheme over DHTs **TKDE 10** Yuzhe Tang, Shuigeng Zhou, Jianliang Xu IEEE Transaction of Knowledge and Data Engineering 22(1): 59-75 (2010) m-LIGHT: Indexing Multi-Dimensional Data over DHTs ICDCS 09 Yuzhe Tang, Jianliang Xu, Shuigeng Zhou, Wang-Chien Lee IEEE International Conference of Distributed Computing Systems 2009: 191-198 Acceptance rate=16% LHT: A Low-Maintenance Indexing Scheme over DHTs ICDCS 08 Yuzhe Tang, Shuigeng Zhou IEEE International Conference of Distributed Computing Systems 2008: 141-151 ----- Patents 2015 Adaptive Auto-pipelining in Stream Processing Applications

Annual Translational Bioinformatics Conference 2015

Bugra Gedik, Scott A. Schneider, Yuzhe Tang, Kun-lung Wu

US patent granted (US9098350B2)

# Teaching

Fall 2022	CIS629/FIN629, Blockchain Foundation and Applications
Spring 2022	CSE384, Introduction to Systems Programming
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), CCS'22 Poster (1st author), ConsensusDay'22 (1st 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)

· Jack Willis, Eniola Mosaku, Nicholas Sweet

#### Alumni

- Dr. Kai Li (Ph.D., 2022), Tenure-track Assistant Professor in CS dept. at San Diego State Univ.
  - o 1st-author papers (during Ph.D.): CCS'21, IMC'21, NDSS'21, Middleware'20, etc.
  - o Internships: IBM Research '20, Amazon '21
  - Award: NortonLife Ph.D. fellowship finalist '22
- M.Sc.: Vinutha Karanth (Microsoft), Sencer Burak Somuncuoglu (Chainalysis), Kang Lou, Qi Zhang (CertiK), 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 BlockDM 21/20/19 (The International Workshop of Blockchain and Data Management, cocommittee chair located with ICDE)

GLSD 20/18 (Great Lake Security Day)

Program Euro SP 23 (7th IEEE European Symposium on Security and Privacy)

committee SecureComm 22 (EAI International Conference on Security and Privacy in Communication

Networks)

EthiCS 22 (The 1st International Workshop on Ethics in Computer Security)
IEEE DSC 22 (5th IEEE Conference on Dependable and Secure Computing))

ICICS 22/21 (The 23rd/24th International Conference on Information and Communications

Security)

IEEE MASS 22 (The 19th IEEE International Conference on Mobile Ad-Hoc and Smart

Systems)

WWW 21/20 (30th/29th The Web Conference)

ICDCS 20/17/15 (41st/38th/36th IEEE International Conference on Distributed Computing

Systems)

IPDPS 18 (32nd IEEE International Parallel and Distributed Processing)
EuroSys 18 (shadow) (The European Conference on Computer Systems)
IEEE Cloud 15 (IEEE 8th International Conference on Cloud Computing)

PAIS 16/15 (9th/8th International Workshop on Privacy and Anonymity in the Information

Society)

Journal reviewer TPDS 22 (IEEE Transactions on Transactions on Parallel and Distributed Systems)

TIFS 22 (IEEE Transactions on Information Forensics and Security)

ToIT 22 (ACM Transactions on Internet Technology) BCRA 22 (BlockChain: Research and Applications) TNSE 22/21 (IEEE Transactions on Network Science and Engineering)

TCC 22 (IEEE Transactions on Cloud Computing)

JPDC 22 (Journal of Parallel and Distributed Computing)

COSE 22 (Computers and Security COSE)

ACM TOCS 17 (ACM Transactions on Computer Systems)

IEEE TKDE 17/16/15 (IEEE Transactions on Knowledge and Data Engineering)

ACM ToIT 21 (ACM Transactions on Internet Technology)

IEEE TSC 21/17/16/15 (IEEE Transactions on Services Computing)

IEEE TCC 21/15 (IEEE Transactions on Cloud Computing)
JBFT 20 (Journal of Banking and Financial Technology)

**IEEE Computer Magazine 17** 

TWeb 15 (ACM Transactions on the Web)

IEEE TCSVT 14 (IEEE Transactions on Circuits and Systems for Video Technology)

Panel review NSF panel 16, 20 (twice), 21

Campus services EECS ABET Assessment and Accreditation committee

EECS Faculty Search Committee, EECS ABET Assessment and Accreditation committee

University academic integrity panel, MAE program review

ECS research day poster judge, 22

# 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 system security
  - NUS ('22) [link], UK Security and Privacy seminar ('22) [link], Ohio State University ('21), University of Louisiana at Lafayette ('21)
- DETER: Denial of Ethereum Txpool Service
  - o 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, co-located 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 [ink].

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"
  - o CSIAC ('17), Syracuse University Alumni Event ('21)