Taejoong (Tijay) Chung

Assistant Professor (tijay@vt.edu, https://taejoong.github.io)

Education

09/2009-02/2015	Ph.D., Computer Science and	Engineering Seoul National	University Seoul Korea

o Supervisors: Prof. Yanghee Choi and Prof. Ted "Taekyoung" Kwon

03/2005–09/2009 **B.S.**, Computer Science and Engineering, POSTECH (Pohang University of Science and Technology), Pohang, Korea.

Professional Experience

08/2020-present Assistant Professor, Department of Computer Science, Virginia Tech, Blacksburg, VA, United States.

02/2023-present Adjunct Professor, Department of Computer Science, POSTECH, Pohang, South Korea.

08/2018–07/2020 Assistant Professor, Department of Computer Science, Rochester Institute of Technology (RIT), Rochester,

NY, United States.

09/2015-08/2018 Postdoctoral Researcher, Northeastern University, Boston, MA, United States.

Honors and Awards

- 2024 NSF CAREER Award
- 2024 Outstanding New Assistant Professor Award at the College of Engineering, Virginia Tech
- 2023 Mutually Agreed Norms for Routing Security (MANRS) Mentor
- 2023 College of Engineering Dean's Memorandum for Outstanding Teaching Evaluations
- 2022 Best Paper Honorable Mention Award, ACM CCS'22
- 2022 Mutually Agreed Norms for Routing Security (MANRS) Research Fellow
- 2019 Distinguished Paper Award, ACM IMC'19
- 2019 Applied Networking Research Prize (ANRP), IETF'105
- 2019 NSF CRII Award
- 2017 Distinguished Paper Award, USENIX Security'17
- 2015 Microsoft Azure Research "Award Program: Microsoft Azure for Research Supports \$20,000"

Grants

- 2024 Leveraging ML for Advanced IRR Validation: Towards a More Secure Internet Infrastructure
 - o Comcast Innovation Fund, 08/2024 07/2025, Sole Primary Investigator, \$30,000
- 2024 CAREER: Securing and Evolving Internet Security Protocols for Naming and Routing
 - \circ National Science Foundation. CNS-2339378, 05/2024 04/2029. Sole Primary Investigator \$691,258 (VT), \$691,258 (total)
- 2023 RoVISTA: Understanding the Current Validation Status of RPKI
 - o Google, Unrestricted Gift. 08/2023. Sole Primary Investigator \$30,000 (VT)
- 2023 IMR: MT: Tools for Measuring Route Origin Validation in Resource Public Key Infrastructure (RPKI) at Scale
 - o National Science Foundation. CNS-2323137, 12/2023 11/2025. Sole Primary Investigator \$599,997 (VT), \$599,997 (total)
- 2023 SaTC: CORE: Medium: Cryptographic accumulators and revocation of credentials

- National Science Foundation. CNS-2247306, 01/2023 01/2025. Primary Investigator, joint with Foteini Baldimtsi (GMU), Anna Lysyanskaya (Brown), Charalampos Papamanthou (Yale), Alan Mislove (NEU). \$240,000 (VT), \$1,200,000 (total)
- 2023 A Study on Key Management Structure for Multi-Metaverse Avatar Authentication and Anonymization Assurance
 - o Ministry of Science and ICT, 01/2023 01/2026, Primary Investigator, \$225,000 (VT), \$163 M (total)
- 2022 Towards a complete view of Route Origin Validation in RPKI
 - o Comcast Innovation Fund, 06/2022 05/2023, Sole Primary Investigator, \$75,000
- 2022 Rapidly Bootstrapping Implementation of DNS-Based Security Extensions with Al-driven Approach o 4-VA, 06/2022 – 05/2023, Sole Primary Investigator, \$25,000
- 2022 Improving Routing Security with a Complete View of Routing Origin Validation (ROV) in RPKI
 - o Commonwealth Cyber Initiative, 05/2022 08/2022, Sole Primary Investigator, \$15,000
- 2021 Enhancing the Privacy and Reliability of Massive-scale Bluetooth Low Energy Contact Tracing
 - Commonwealth Cyber Initiative, 06/2021 05/2022. Co-Primary Investigator, joint with Daphne Yao (VT), Carol Fung (VCU) \$100,000 (VT), \$150,000 (total)
- 2019 CNS Core: Large: Collaborative Research: Towards an Evolvable Public Key Infrastructure
 - National Science Foundation. CNS-1901090, 06/2019 05/2022. Primary Investigator, joint with Dave Levin (UMD), Bruce M. Maggs (Duke University), Alan Mislove (NEU), Christo Wilson (NEU), Bryan Parno (CMU). \$300,000 (VT), \$2,000,000 (total)
- 2019 CRII: SaTC: Measuring and Improving the Management of Resource Public Key Infrastructure (RPKI)
 - o National Science Foundation. CNS-1850465, 10/2019 09/2021. Sole Primary Investigator. \$166,561
- 2015 Personal Recommendation System and Privacy Protection through Big Data Analysis on Online Social Networks
 - o National Research Foundation of Korea (NRF). NRF-2016018668, 03/2015 02/2016. Sole Primary Investigator. $$$W$50,000,000 (\approx $44,000)$

Refereed Conference Publications

USENIX ATC'24 mmTLS: Scaling the Performance of Encrypted Network Traffic Inspection

J. Yoon, S. Do, D. Kim, T. Chung, and K. Park USENIX Annual Technical Conference, Santa Clara, United States, July 2024

USENIX Security'24 SPF Beyond the Standard: Management and Operational Challenges in Practice and Practical Recommendations

Md. Ishtiaq Ashiq, W. Li, T. Fiebig, and T. Chung USENIX Security, Philadelphia, United States, August 2024

Oakland'24 An Analysis of Recent Advances in Deepfake Image Detection in an Evolving Threat Landscape

S. Muhammad Abdullah, A. Cheruvu, S. Kanchi, T. Chung, P. Gao, M. Jadliwala, and B. Viswanath IEEE Symposium on Security and Privacy, San Francisco, United States, May 2024

NDSS'24 IRRedicator: Pruning IRR with RPKI-Valid BGP Insights

M. Kang, W. Li, R. van Rijswijk-Deij, T. Kown, and T. Chung NDSS, San Diego, USA, Feb. 2024

HotNets'23 No Root Store Left Behind

J. Larisch, W. Aqeel, T. Chung, E. Kohler, D. Levin, B. Maggs, B. Parno, and C. Wilson ACM HotNets, Cambridge, USA, December 2023

ACSAC'23 Delegation of TLS Authentication to CDNs using Revocable Delegated Credentials

D. Yoon, T. Chung, and Y. Kim ACSAC, Austin, United States, Canada, December 2023 IMC'23 RoVista: Measuring and Understanding the Route Origin Validation (ROV) in RPKI

W. Li, Z. Lin, Md. Ishtiaq Ashiq, E. Aben, R. Fontugne, A. Phokeer, and T. Chung ACM IMC, Montreal, Canada, October 2023

USENIX Security'23 You've Got Report: Measurement and Security Implications of DMARC Reporting

Md. Ishtiaq Ashiq, W. Li, T. Fiebig, and T. Chung USENIX Security, Anaheim, United States, August 2023

PAM'23 Exploring the Evolution of the TLS Certificate Ecosystem

S. Farhan and T. Chung PAM, Virtual, March 2023

PAM'23 Measuring TTL Violation of DNS Resolvers in the Wild

P. Bhowmick, Md. Ishtiaq Ashiq, C. Deccio, and T. Chung PAM, Virtual, March 2023

IMC'22 A Comparative Analysis of Certificate Pinning in Android & iOS

A. Pradeep, M. Talha Paracha, P. Bhowmick, A. Davanian, A. Razaghpanah, T. Chung, M. Lindorfer, N. Vallina-Rodriguez, D. Levin, and D. Choffnes ACM IMC, Nice, France, October 2022

CCS'22 Hammurabi: A Framework for Pluggable, Logic-based X.509 Certificate Validation Policies

J. Larisch, W. Aqeel, C. Wilson, A. Mislove, T. Chung, D. Levin, B. Parno, and B. Maggs ACM CCS, Los Angeles, CA, USA, Nov 2022

H. Lee, Md. Ishtiaq Ashiq, M. Muller, R. van Rijswijk-Deij, T. Kwon, T. Chung USENIX Security, Boston, United States, August 2022

SIGCOMM'21 IP Unbound: Robust, Responsive CDN-scale service without CDN-Scale Addresses

M. Fayed, V. Giotsas, L. Bauer, S. Kerola, M. Majkowski, P. Odintsov, J. Sitnicki, T. Chung, D. Levin, A. Mislove, N. Sullivan, C. Wood

ACM SIGCOMM, Virtual Conference, Aug. 2021

PAM'21 Measurement and Analysis of Automated Certificate Reissuance

O. Omolola, R. Roberts, I. Ashiq, T. Chung, D. Levin, and A. Mislove PAM, Virtual Conference, Mar. 2021

IMC'20 The Reality of Algorithm Agility: Studying the DNSSEC Algorithm Life-Cycle

M. Mueller, W. Toorop, T. Chung, J. Janssen, and R. van Rijswijk-Deij IMC, Pittsburgh, United States, Oct. 2020

FCS'20 Assertion-Carrying Certificates

W. Aqeel, Z. Hanif, J. Larisch, O. Omolola, T. Chung, D. Levin, B. Maggs, A. Mislove, B. Parno, and C. Wilson

Workshop on Foundations of Computer Security, Boston, United States, June 2020

USENIX Security'20 A Longitudinal and Comprehensive Study of the DANE Ecosystem in Email

H. Lee, A. Gireesh, R. van Rijswijk-Deij, T. Kwon, T. Chung USENIX Security, Boston, United States, August 2020

CCS'19 You Are Who You Appear to Be: A Longitudinal Study of Domain Impersonation in TLS Certificates

R. Roberts, Y. Goldschlag, R. Walter, T. Chung, A. Mislove, D. Levin ACM CCS, London, United Kingdom, Nov. 2019

IMC'19 RPKI is Coming of Age: A Longitudinal Study of RPKI Deployment and Invalid Route Origins

T. Chung, E. Aben, T. Bruijnzeels, B. Chandrasekaran, D. Choffnes, D. Levin, B. M. Maggs, A. Mislove, R. van Rijswijk-Deij, J. P. Rula, and N. Sullivan ACM IMC, Amsterdam, The Netherlands, Oct. 2019

IMC'19 Roll, Roll, Roll your Root: A Comprehensive Analysis of the First Ever DNSSEC Root KSK Rollover

M. Müller, M. Thomas, D. Wessels, W. Hardaker, T. Chung, W. Toorop, and R. van Rijswijk-Deij ACM IMC, Amsterdam, The Netherlands, Oct. 2019

NDSS'19 maTLS: How to Make TLS middlebox-aware?

H. Lee, Z. Smith, J. Lim, G. Choi, S. Chun, T. Chung, and T. Kwon NDSS, San Diego, USA, Feb. 2019

IMC'18 Is the Web Ready for OCSP Must Staple?

T. Chung, J. Lok, B. Chandrasekaran, D. Choffnes, D. Levin, B. M. Maggs, A. Mislove, J. Rula, N. Sullivan, and C. Wilson

ACM IMC, Boston, USA, Nov. 2018

CSCW'18 Privacy Leakage in Event-based Social Networks: A Meetup Case Study

T. Chung, J. Han, D. Choi, T. Kwon, J. Rha, and H. Kim ACM CSCW, Jersey City, USA, Nov. 2018

IMC'17 Understanding the Role of Registrars in DNSSEC Deployment

T. Chung, R. van Rijswijk-Deij, D. Choffnes, A. Mislove, C. Wilson, D. Levin, and B. M. Maggs ACM IMC, London, UK, Nov. 2017

USENIX Security'17 A Longitudinal, End-to-End View of the DNSSEC Ecosystem

T. Chung, R. van Rijswijk-Deij, B. Chandrasekaran, D. Choffnes, D. Levin, B. M. Maggs, A. Mislove, and C. Wilson

USENIX Security, Vancouver, Canada, Aug. 2017

IMC'16 Measuring and Applying Invalid SSL Certificates: The Silent Majority

T. Chung, Y. Liu, D. Choffnes, D. Levin, B. M. Maggs, A. Mislove, and C. Wilson ACM IMC, Santa Monica, CA, USA, Nov. 2016

IMC'16 Tunneling for Transparency: A Large-Scale Analysis of End-to-End Violations in the Internet

T. Chung, D. Choffnes, and A. Mislove ACM IMC, Santa Monica, CA, USA, Nov. 2016

CCS'16 Measurement and Analysis of Private Key Sharing in the HTTPS Ecosystem

F. Cangialosi, T. Chung, D. Choffnes, D. Levin, B. M. Maggs, A. Mislove, and C. Wilson ACM CCS, Vienna, Austria, Oct. 2016

COSN'15 Characterizing Conversation Patterns in Reddit: From the Perspectives of Content Properties and User Participation Behaviors

D. Choi, J. Han, T. Chung, Y. Ahn, B. Chun, and T. Kwon ACM COSN, Stanford, CA, USA, Nov. 2015

COSN'15 Sharing Topics in Pinterest: Understanding Content Creation and Diffusion Behaviors

J. Han, D. Choi, A. Choi, T. Chung, T. Kwon, J. Rha, and C. Chuah ACM COSN, Stanford, CA, USA, Nov. 2015

ANCS'14 CoRC: Coordinated Routing and Caching for Named Data Networking

H. Choi, J. Yoo, T. Chung, N. Choi, T. Kwon, and Y. Choi IEEE ANCS, Marina del Rey, CA, USA, Oct. 2014

WWW'14 Unveiling Group Characteristics in Online Social Games: A Socio-Economic Analysis

T. Chung, J. Han, D. Choi, T. Kwon, H. K. Kim and Y. Choi ISOC WWW, Seoul, Korea, Apr. 2014

IFIP Networking'13 Spatial and Temporal Locality of Content in BitTorrent: A Measurement Study

T. Chung, J. Han, H. Lee, J. Kangasharju, T. Kwon, and Y. Choi IFIP Networking, Brooklyn, NY, USA, May 2013

SIGMETRICS'12 Bundling Practice in Bittorrent: What, How, and Why

J. Han, S. Kim, T. Chung, T. Kwon, H. Kim, and Y. Choi ACM SIGMETRICS, London, UK, Jun. 2012

IFIP Networking'12 Content Publishing and Downloading Practice in BitTorrent

S. Kim, J. Han, T. Chung, T. Kwon, H. Kim, and Y. Choi IFIP Networking, Prague, Czech, May 2012

GLOBECOM'12 Bandwidth Allocation for BitTorrent under Multi-Torrent Environments

J. Choi, J. Han, T. Chung, E. Cho, T. Kwon, and Y. Choi IEEE GLOBECOM, Houston, Texas, United States, Dec. 2011

Journal Publications

Privacy Guarantees of BLE Contact Tracing: A Case Study on COVIDWISE.

Salman Ahmed, Ya Xiao, T. Chung, Carol Fung, Moti Yung, and Danfeng (Daphne) Yao. IEEE Computer Society, 2021

Rolling with Confidence: Managing the Complexity of DNSSEC Operations

Moritz Muller, T. Chung, Alan Mislove, and Roland van Rijswijk-Deij IEEE Transactions on Network and Service Management (IEEE TNSM), 2019

Predicting Content Consumption from Content-to-Content Relationships

Jinyoung Han, Daejin Choi, T. Chung, Chen-Nee Chuah, Hyun-chul Kim, and Ted "Taekyoung" Kwon Elsevier Journal of Network and Computer Applications (JNCA), Vol. 132, pp. 1, April 2019

A First Look at Certification Authority Authorization (CAA)

Quirin Scheitle, T. Chung, Jens Hiller, Oliver Gasser, Johannes Naab, Roland van Rijswijk-Deij, Oliver Hohlfeld, Ralph Holz, Dave Choffnes, Alan Mislove, and Georg Carle

ACM SIGCOMM Computer Communications Review (CCR), Vol. 48, pp. 2, Apr. 2018

An End-to-End View of DNSSEC Ecosystem Management

T. Chung, R. van Rijswijk-Deij, B. Chandrasekaran, D. Choffnes, D. Levin, B. M. Maggs, A. Mislove, and C. Wilson

USENIX Magazine ;login:, Vol. 42, No. 4, Dec. 2017

A Target-centric Surveillance System based on Localization and Social Networking

J. Han, N. Choi, T. Chung, T. Kwon, and Y. Choi Multimedia Tools and Applications (MTAP), Vol. 73, Issue 1, pp. 241-265, Nov. 2014

Strategic Bundling for Content Availability and Fast Distribution in BitTorrent

J. Han, T. Chung, S. Kim, H. Kim, J. Kangasharju, T. Kwon, and Y. Choi Computer Communication (COMCOM), Vol. 43, pp. 64-73, May 2014

Bundling Practice in Bittorrent: What, How, and Why

J. Han, S. Kim, T. Chung, T. Kwon, H. Kim, and Y. Choi ACM SIGMETRICS Performance Evaluation Review, Vol. 40, No. 1, pp. 77-88, Jun. 2012.

How Prevalent is Content Bundling in BitTorrent?

J. Han, T. Chung, S. Kim, T. Kwon, H. Kim, and Y. Choi ACM SIGMETRICS Performance Evaluation Review, Vol. 39, No. 1, pp. 319-320, Jun. 2011.

Posters

IMC'19 Tracking Registrar Support for DNSSEC: It's Slowly Getting Better

Spencer Roth, R. van Rijswijk-Deij, and T. Chung IMC, Amsterdam, The Netherlands, USA, Aug. 2017

SIGCOMM'17 The Root Canary: Monitoring and Measuring the DNSSEC Root Key Rollover

R. van Rijswijk-Deij, T. Chung, D. Choffnes, A. Mislove, and W. Toorop SIGCOMM, Los Angeles, CA, USA, Aug. 2017

ACNS'14 Toward Terabyte-scale Caching with SSD in a Named Data Networking Router

W. So, T. Chung, H. Yuan, D. Oran, and M. Stapp ANCS, Marina del Rey, CA, USA, Oct. 2014

PAM'13 Spatial and Temporal Locality of Swarm Dynamics in BitTorrent

T. Chung, J. Han, H. Lee, J. Kangasharju, T. Kwon, and Y. Choi PAM, Hong Kong, March. 2013.

Non-Refereed Conference Publications

TPRC'17 Investigating End-To-End Integrity Violations in Internet Traffic

A. Mislove, D. Choffnes, and T. Chung TPRC, Arlington, VA, USA, Sept. 2017

Teaching

- F20, F23 CS 6204, Public Key Infrastructure and Network Security.
- F22, F23 CS 5584, Network Security.
 - S24 **CS/ECE 5560**, Fundamentals of Information Security.
- S21, S22 CS 4264, Principles of Computer Security.
- F18, F19 CSCI 351, Data Communication and Networks.

Advising

- 01/2024 Present Hoang Tran, Ph.D. Students, Virginia Tech.
- 08/2023 Present Munshi Rejwan Ala Muid, Ph.D. Students, Virginia Tech, Co-advised with Thang Hoang.
- 01/2021 Present Mohammad Ishtiaq Ashiq Khan, Ph.D. Students, Virginia Tech.
- 01/2021 Present Weitong Li, Ph.D. Students, Virginia Tech.
- 01/2021 11/2023 Protick Bhowmick, Masters, Virginia Tech, now at Yale University.
- 08/2020 08/2022 **Syed Muhammad Farhan**, Masters, Virginia Tech, now at Amazon.

Ph.D. Committees

- Spring 2024 Zhongdong Liu, Virginia Tech.
- Spring 2024 Miles Frantz, Virginia Tech.
- Spring 2024 Muhammad Talha Paracha, Northeastern University.
- Spring 2023 Tung Dao, Virginia Tech.
 - Fall 2022 Jiameng Pu, Virginia Tech.

Service

Award Committee Member.

- '24 IETF/IRTF Applied Networking Research Prize (ANRP)
- 23 IETF/IRTF Applied Networking Research Prize (ANRP)
- 22 IETF/IRTF Applied Networking Research Prize (ANRP)
- '21 IETF/IRTF Applied Networking Research Prize (ANRP)
- 21 ACM Student Research Competition (SRS) for SIGCOMM poster and demo session General Chair.
- '22 The ACM/IRTF Applied Networking Research Workshop (ANRW) Steering Committee Member.
- '23 The ACM/IRTF Applied Networking Research Workshop (ANRW)

Program Committee Member.

- '24 The ACM/IRTF Applied Networking Research Workshop (ANRW)
- '24 The DNS Operations, Analysis, and Research Center (DNS-OARC)
- '24 ACM Internet Measurement Conference (IMC)
- '24 ACM Conference on emerging Networking EXperiments and Technologies (CoNEXT)
- '24 The Passive and Active Measurement (PAM)

- '23 ACM Asian Conference on Internet Engineering (AINTEC)
- '23 IEEE SecWeb
- '23 IEEE MetaCom Workshop
- '23 The Passive and Active Measurement (PAM)
- '23 ACM Conference on SIGMETRICS/Performance
- '23 IEEE Symposium on Security and Privacy (Oakland)
- '22 ACM Conference on emerging Networking EXperiments and Technologies (CoNEXT)
- '22 ACM Internet Measurement Conference (IMC)
- '22 IEEE International Conference on Network Protocols (ICNP)
- '22 The Passive and Active Measurement (PAM)
- '22 ACM Conference on SIGMETRICS/Performance
- '21 ACM Conference on Computer and Communications Security (CCS) External reviewer
- '21 The ACM/IRTF Applied Networking Research Workshop (ANRW)
- '21 ACM Internet Measurement Conference (IMC)
- '21 IEEE International Conference on Network Protocols (ICNP)
- '21 The Passive and Active Measurement (PAM)
- '20 The ACM/IRTF Applied Networking Research Workshop (ANRW)
- '20 The Network Traffic Measurement and Analysis Conference (TMA)
- '20 The Passive and Active Measurement (PAM)
- '19 ACM Internet Measurement Conference (IMC)
- '19 International Conference on Social Informatics (SocInfo)
- '19 The Passive and Active Measurement (PAM)
- '19 International AAAI Conference on Web and Social Media (ICWSM)
- '18 International AAAI Conference on Web and Social Media (ICWSM)
- '17 International AAAI Conference on Web and Social Media (ICWSM)
- '17 IEEE International Conference on Ubiquitous Computing and Communications (IUCC)
- '14 Poster Selection Committee of ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS)

Shadow Program Committee Member.

- '18 ACM Internet Measurement Conference (IMC)
- '17 ACM Internet Measurement Conference (IMC)

Artifact Evaluation Member.

- International Conference on emerging Networking EXperiments and Technologies (CoNEXT)
 Web Chair.
- '22 ACM SIGCOMM
- '21 ACM SIGCOMM
- '21 ACM Internet Measurement Conference (PAM)
- '19 ACM Internet Measurement Conference (IMC)

Travel Grant Chair.

'22 ACM Internet Measurement Conference (IMC)

Registration Chair.

'18 ACM Internet Measurement Conference (IMC)

Journal Reviewer.

'24 Journal of Cybersecurity

- '23 Journal of Law and Legislation (KJLL)
- '23 ACM Transactions on Privacy and Security
- '23 ACM Computing Surveys
- '22 IEEE Transactions on Dependable and Secure Computing
- '21 Elsevier Computers & Security
- '21 IEEE/ACM Transactions on Networking
- '20 ACM Computer Communication Review
- '19 IEEE Transactions on Dependable and Secure Computing
- '19 IEEE/ACM Transactions on Networking
- '19 ACM Transactions on Privacy and Security
- '19 ACM Computer Communication Review
- '16 ACM Computer Communication Review

Proposal Reviewer.

'21 The Commonwealth Cyber Initiative (CCI): NextG

Internal and Other Service.

- '22 VT Hacks IX Judge
- '21 Career Panel: BranchOut, A Youth Community Outreach Program for Local High School Students
- '21 VT Hacks IX Judge

References

Alan Mislove (amislove@ccs.neu.edu)

Associate Professor of Computer Science, Northeastern University, USA

David Choffnes (choffnes@ccs.neu.edu)

Associate Professor of Computer Science, Northeastern University, USA

Bruce M. Maggs (bmm@cs.cmu.edu)

Professor of Computer Science, Duke University and Vice President of Research, Akamai Technologies, USA

Christo Wilson (c.wilson@ccs.neu.edu)

Associate Professor of Computer Science, Northeastern University, USA

Dave Levin (dml@cs.umd.edu)

Assistant Professor of Computer Science, University of Maryland, USA