Dongsu Han

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School of Electrical Engineering and
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Executive Summary

Dongsu Han has actively worked in the area of systems and networking focusing on problems that arise from the fact that modern networking applications often run on the cloud at scale, such as Internet-scale video delivery, high-speed network and application design, low-latency congestion control, and security and privacy of network applications. He has published numerous technical papers at premier conferences and workshops, including SOSP, OSDI, SIGCOMM, NSDI, HotNets, CCS, Mobisys, and EuroSys. Notable recognitions of his work include NSDI Best Paper and Community Awards. He has served in program committees for a number of outstanding venues, including ACM CoNEXT PC Chair, SIGCOMM, NSDI, ATC, HotNets, INFOCOM, APSys, APNet (co-chair), ICNP, ACM ANCS, and HotMiddlebox/KBNets (workshop co-chair). He is currently serving as an associate editor for IEEE/ACM Transactions on Networking.

Research Funding. He has secured multi-billion KRW of research funds from various sources including National Research Foundation of Korea, National Research Foundation of Korea, IITP of Korea, Office of Naval Research Global (ONRG) of USA, and Asian Office of Aerospace Research and Development (AOARD) of USA, as well as industry funding from Samsung Electronics, Microsoft Research Asia, Toyota Motor Company, and many others. He has been a PI for an Early Career Program of NRF and a multi-year IITP (Institute for Information and communications Technology Promotion) projects.

Education

Ph.D. in Computer Science December 2012
Carnegie Mellon University, Pittsburgh, PA
Dissertation title: *"Supporting Long Term Evolution in an Internet Architecture"*
Advisor: Srinivasan Seshan

M.S. in Computer Science December 2010
Carnegie Mellon University, Pittsburgh, PA
Degree offered as part of the Ph.D program

B.S. in Computer Science (summa cum laude) February 2004
Korea Advanced Institute of Science and Technology (KAIST), Korea
Chairman of KAIST Board of Trustees Award

Research Interests

Networked systems, cloud computing, and security

EMPLOYMENT HISTORY

School of Electrical Engineering, KAIST Jun 2013 – Current
Professor (March 2023-Current)
Associate Professor (March 2017 – February 2023)
Assistant Professor (June 2013 – February 2017)

Visiting Scholar, University of California Irvine Aug 2023-July 2024
Host: Prof. Sangeetha Abdu Jyothi

Graduate School of Information Security, KAIST Oct 2013 – Feb 2021
Adjunct Professor

Graduate School of Artificial Intelligence, KAIST Nov 2019 – Current
Adjunct Professor

Computer Science Department, Carnegie Mellon University Jan 2013 – May 2013
Post-doctoral Associate **(**with Prof. Peter Steenkiste)

Computer Science Department, Carnegie Mellon University Aug 2007 – Dec 2012
Graduate Research Assistant (Advisor: Prof. Srinivasan Seshan)
Major projects related to my dissertation include eXpressive Internet Architecture (XIA), Redundant Packet Transmission (RPT), and a neighborhood-assisted on-demand video distribution system.

Intel Labs Pittsburgh Jun 2009 – Aug 2009
Intern (Mentors: Dina Papagiannaki and Michael Kaminsky)

Intel Labs Pittsburgh Jun 2008 – Aug 2008
Intern (Mentors: Dina Papagiannaki and Michael Kaminsky)

FUTURE SYSTEMS, INC., Korea Mar 2004 – Dec 2006
Software Engineer

PUBLICATIONS

Conference and Workshop Papers

Students advised and post-doctorate fellow hosted by myself are underlined. * is equal contribution

[C-67] Presto: Hybrid CPU-GPU Preprocessing Framework for Video-based AI Inference System
Jihyuk Lee, Dongsu han, and Jaehong Kim
International Workshop on Networked AI Systems **(NetAISys) 2025**

[C-66] NarrAD: Automatic Generation of Audio Descriptions for Movies with Rich Narrative Context
Jaehyeong Park, Juncheol Ye, Seungkook Lee, Hyun W. Ka , and Dongsu Han
IEEE/CVF Winter Conference on Application of Computer Vision **(WACV) 2025**
(Oral, top 8.3% of submissions)

[C-65] Agua: A Concept-based Explainer for Systems
Sagar Patel, Dongsu Han, Nina Narodytska, and Sangeetha Abdu Jyothi
ACM SIGCOMM 2025 (Acceptance rate: 13.6%)

[C-64] SAND: A New Programming Abstraction for Video-based Deep Learning
Juncheol Ye, Seungkook Lee, Hwijoon Lim, Jihyuk Lee, Uitaek Hong, Youngjin Kwon, and Dongsu Han
SOSP 2025 (Acceptance rate: 18%)

[C-63] Scaling Beyond the GPU Memory Limit for Large Mixture-of-Experts Model Training
Yechan Kim*, Hwijoon Lim*, and Dongsu Han
ICML 2024 (Acceptance rate: 27.5%)

[C-62] Accelerating Model Training in Multi-cluster Environments with Consumer-grade GPUs
Hwijoon Lim, Juncheol Ye, Sangeetha Abdu Jyothi, and Dongsu Han
ACM SIGCOMM 2024 (Acceptance rate: 16.9%)

[C-61] TopFull: An Adaptive Top-Down Overload Control for SLO-Oriented Microservices
Jinwoo Park, Jaehyeong Park, Youngmok Jung, Hwijoon Lim, Hyunho Yeo, and Dongsu Han
ACM SIGCOMM 2024 (Acceptance rate: 16.9%)

[C-60] Toward Trustworthy Learning-Enabled Systems with Concept-Based Explanations
Sagar Patel, Dongsu Han, Nina Narodytska, and Sangeetha Abdu Jyothi
ACM HotNets 2024 (Acceptance rate: 23.9%)

[C-59] FlexPass: A Case for Flexible Credit-based Transport for Datacenter Networks
Hwijoon Lim, Jaehong Kim, Inho Cho, Keon Jang, Wei Bai, and Dongsu Han
EuroSys 2023 (Acceptance rate: 16.7%)

[C-58] AccelIR: Task-aware Image Compression for Accelerating Neural Restoration
Juncheol Ye, Hyunho Yeo, Jinwoo Park, and Dongsu Han
IEEE/CVF CVPR 2023 (Acceptance rate: 25.8%)

[C-57] Neural Cloud Storage: Innovative Cloud Storage Solution for Cold Video
Jinyeong Lim, Juncheol Ye, Jaehong Kim, Hwijoon Lim, Hyunho Yeo, and Dongsu Han
ACM HotStorage 2023

[C-56] SAND: A Storage Abstraction for Video-based Deep Learning
Uitaek Hong, Hwijoon Lim, Hyunho Yeo, Jinwoo Park, and Dongsu Han
ACM Workshop on Hot Topics in Storage and File Systems **(HotStorage) 2023**

[C-55] PipeDevice: A Hardware-Software Co-Design Approach to Intra-Host Container Communication
Qiang Su, Chuanwen Wang, Zhixiong Niu, Ran Shu, Peng Cheng, Yongqiang Xiong , Dongsu Han, Chun Jason Xue, Hong Xu
ACM CoNEXT 2022 (Acceptance rate: 18.5%)

[C-54] OutRAN: Co-optimizing for Flow Completion Time in Radio Access Network
Jaehong Kim, Yunheon Lee, Hwijoon Lim, Youngmok Jung, Song Min Kim, Dongsu Han
ACM CoNEXT 2022 (Best Paper Award Nominee, Acceptance rate: 18.5%)

[C-53] NeuroScaler: Neural Video Enhancement at Scale
Hyunho Yeo, Hwijoon Lim, Jaehong Kim, Youngmok Jung, Juncheol Ye, and Dongsu Han
ACM SIGCOMM 2022 (Acceptance rate: 19.6%)

[C-52] TSPipe: Learn from Teacher Faster with Pipelines
Hwijoon Lim, Yechan Kim, Sukmin Yun, Jinwoo Shin, and Dongsu Han
International Conference on Machine Learning **(ICML) 2022** (Acceptance rate: 21.9%)

[C-51] GRAF: A Graph Neural Network Based Proactive Resource Allocation Framework for SLO-oriented Microservice
Jinwoo Park*, Byungkwon Choi*, Chunghan Lee, **Dongsu Han**
International Conference on emerging Networking EXperiments and Technologies **(ACM CoNEXT) 2021** (Acceptance rate: 22.7%)

[C-50] PHPA: A Proactive Autoscaling Framework for Microservice Chain
Byungkwon Choi, Jinwoo Park, Chunghan Lee (Toyota), **Dongsu Han**
Asia-Pacific Workshop on Networking **(APNet) 2021**

[C-49] Towards Timeout-less Transport in Commodity Datacenter Networks
Hwijoon Lim, Wei Bai (Microsoft Research), Yibo Zhu (ByteDance), Youngmok Jung, **Dongsu Han**
ACM European Conference on Computer Systems (**Eurosys**) **2021** (Acceptance rate: 19.9%)

[C-48] Lumos: Improving Smart Home IoT Visibility and Interoperability through Analyzing Mobile Apps
Jeongmin Kim, Steven Y. Ko, Sooel Son, **Dongsu Han**
IEEE International Conference on Network Protocols **(ICNP) 2020** (Acceptance rate: 16.3%)

[C-47] Leveraging SIMD Parallelism for Accelerating Network Applications
Hejing Li, Juhyeng Han, **Dongsu Han**
ACM APNET 2020

[C-46] Nemo: Enabling Neural-enhanced Video Streaming on Commodity Mobile Devices
Hyunho Yeo, Chan Ju Chong, Youngmok Jung, Juncheol Ye, **Dongsu Han**
In proceedings of the ACM Annual International Conference On Mobile Computing And Networking **(MobiCom) 2020** (Acceptance rate: 16.1 %)

[C-45] Neural-enhanced Live Streaming: Improving Live Video Ingest Via Online Learning
Jaehong Kim*, Youngmok Jung*, Hyunho Yeo, Juncheol Ye, **Dongsu Han**
ACM SIGCOMM 2020 (Acceptance rate: 21.2%)

[C-44] Netkernel: Making Network Stack Part of the Virtualized Infrastructure
Zhixiong Niu (Microsoft Research), Hong Xu (City University of Hong Kong), Peng Cheng (Microsoft Research), Qiang Su (City University of Hong Kong), Yongqiang Xiong (Microsoft Research), Tao Wang (New York University), **Dongsu Han** (KAIST), Keith Winstein (Stanford University)
USENIX ATC 2020 (Acceptance rate: 18.7%)

[C-43] Toward Scaling Hardware Security Module for Emerging Cloud Services
Juhyeng Han (KAIST), Seongmin Kim (KAIST), Taesoo Kim (Georgia Tech), **Dongsu Han**
In proceedings of the Workshop on System Software for Trusted Execution **(SysTEX) 2019**

[C-42] FlowShader: A Generalized Framework for GPU-accelerated VNF Flow Processing
Xiaodong Yi, Junjie Wang (The University of Hong Kong); Jingpu Duan (Southern University of Science and Technology); Wei Bai (Microsoft Research); Chuan Wu (The University of Hong Kong); Yongqiang Xiong (Microsoft Research); **Dongsu Han** (KAIST)
ICNP 2019 (Acceptance rate: 19.3%)

[C-41] Congestion Control for Cross-Datacenter Networks
Gaoxiong Zeng (HKUST); Wei Bai (HKUST and Microsoft); Ge Chen, Kai Chen (HKUST); **Dongsu Han** (KAIST); Yibo Zhu (ByteDance); Lei Cui (Huawei)
ICNP 2019 (Acceptance rate: 19.3%)

[C-40] Cybercriminal Minds: An Investigative Study of Cryptocurrency Abuses in the Dark Web
Seunghyeon Lee, Changhoon Yoon, Heedo Kang, Yeonkeun Kim, Yongdae Kim, **Dongsu Han**, Sooel Son, Seungwon Shin
Network and Distributed System Security **(NDSS)** Symposium **2019** (Acceptance rate: 17.1%)

[C-39] APPx: An Automated App Acceleration Framework for Low Latency Mobile App
Byungkwon Choi, Jeongmin Kim, Daeyang Cho, Seongmin Kim, **Dongsu Han**
ACM CoNEXT 2018 (Acceptance rate: 19.7%)

[C-38] Neural Adaptive Content-aware Internet Video Delivery
Hyunho Yeo, Youngmok Jung, Jaehong Kim, Jinwoo Shin, **Dongsu Han**
USENIX Symposium on Operating Systems Design and Implementation **(OSDI) 2018**
(Acceptance rate: 18.2%)

[C-37] How will Deep Learning Change Internet Video Delivery?
Hyunho Yeo, Sunghyun Do, **Dongsu Han**
ACM HotNets 2017 (Acceptance rate: 22.5%)

[C-36] Network Stack as a Service in the Cloud
Zhixiong Niu, Hong Xu, **Dongsu Han,** Peng Cheng, Yongqiang Xiong, Guo Chen, Keith Winstein
ACM HotNets 2017 (Acceptance rate: 22.5%)

[C-35] Credit-Scheduled Delay-Bounded Congestion Control for Datacenters
Inho Cho, Keon Jang, **Dongsu Han**
ACM SIGCOMM 2017 (Acceptance rate: 14.4%)

[C-34] SGX-Box: Enabling Visibility on Encrypted Traffic using a Secure Middlebox Module
Juhyeng Han, Seongmin Kim, Jaehyeong Ha**, Dongsu Han**
ACM APNet 2017

[C-33] Combining ECN and RTT for Datacenter Transport
Gaoxiong Zeng, Wei Bai, Ge Chen, Kai Chen, **Dongsu Han**, Yibo Zhu
ACM APNet 2017

[C-32] Enhancing Security and Privacy of Tor's Ecosystem by using Trusted Execution Environments
Seongmin Kim, Juhyeng Han, Jaehyeong Ha, Taesoo Kim, **Dongsu Han**
USENIX NSDI 2017 (Acceptance rate: 18%)

[C-31] mOS: A Reusable Networking Stack for Flow Monitoring Middleboxes
Muhammad Asim Jamshed, YoungGyoun Moon, Donghwi Kim, **Dongsu Han**, KyoungSoo Park
USENIX NSDI 2017 (Acceptance rate: 18%)

[C-30] Rate-Aware Flow Scheduling for Commodity Data Center Networks
Ziyang Li, Wei Bai, Kai Chen, **Dongsu Han**, Yiming Zhang, Dongsheng Li, Hongfang Yu
IEEE Infocom 2017

[C-29] SGX-Shield: Enabling Address Space Layout Randomization for SGX Programs
Jaebaek Seo, Byoungyoung Lee, Sungmin Kim, Ming-Wei Shih, Insik Shin, **Dongsu Han**, Taesoo Kim
NDSS 2017 (Acceptance rate: 16%)

[C-28] Enabling Automatic Protocol Behavior Analysis for Android Applications
Jeongmin Kim*, Hyunwoo Choi, Hun Namkung, Woohyun Choi, Byungkwon Choi, Hyunwook Hong, Yongdae Kim, Jonghyup Lee, **Dongsu Han**
ACM CoNEXT 2016 (Acceptance rate: 18.4%)
* co-first authors

[C-27] Expeditus: Congestion-aware Load Balancing in Clos Data Center Networks
Peng Wang, Hong Xu, Zhixiong Niu, **Dongsu Han**, Yongqiang Xiong
ACM Symposium on Cloud Computing **(SOCC)** 2016 (Acceptance rate: 25.1%)

[C-26] U-HAUL: Efficient State Migration in NFV
Libin Liu, Hong Xu, Zhixiong Niu, Peng Wang, **Dongsu Han**
ACM APSys 2016

[C-25] DFC: Accelerating String Pattern Matching for Network Applications
Byungkwon Choi, Jongwook Chae, Muhammad Jamshed, Kyoungsoo Park, **Dongsu Han**
USENIX NSDI (Symposium on Networked Systems Design and Implementation) 2016 (Acceptance rate: 19.7%)

[C-24] OpenSGX: An Open Platform for SGX Research
Prerit Jain, Soham Desai, Seongmin Kim*, Ming-Wei Shih, JaeHyuk Lee, Changho Choi, Youjung Shin, Taesoo Kim, Brent Byunghoon Kang, **Dongsu Han**
Network and Distributed System Security (**NDSS**) Symposium 2016 (Acceptance rate: 15.4%)
* Presenting author at NDSS

[C-23] A First Step Towards Leveraging Commodity Trusted Execution Environments for Network Applications
Seongmin Kim, Youjung Shin, Jaehyung Ha, Taesoo Kim, **Dongsu Han**
ACM HotNets 2015 (Acceptance rate: 18.6%)

[C-22] Practical Message-passing Framework for Large-scale Combinatorial Optimization
Inho Cho*, Soya Park*, Sejun Park, **Dongsu Han**, Jinwoo Shin
(*co-first authors)
IEEE International Conference on Big Data **(IEEE BigData)** 2015
(Acceptance rate: 18%)

[C-21] Haetae: Scaling the Performance of Network Intrusion Detection with Many-core Processors
Jaehyun Nam, Muhammad Jamshed, Byungkwon Choi, **Dongsu Han**, and KyoungSoo Park
International Symposium on Research in Attacks, Intrusions and Defenses (**RAID**) 2015 (Acceptance rate: 23.5%)

[C-20] Breaking and Fixing VoLTE: Exploiting Hidden Data Channels and Mis-implementations
Hongil Kim, Dongkwan Kim, Minhee Kwon, Hyungseok Han, Yeongin Jang, **Dongsu Han**, Taesoo Kim, Yongdae Kim
ACM Conference on Computer and Communications Security (**CCS**) 2015 (Acceptance rate: 19.8%)

[C-19] MemScope: Analyzing Memory Duplication on Android Systems
Byeoksan Lee, Seong Min Kim, Eru Park, **Dongsu Han**
ACM SIGOPS Asia-Pacific Workshop on Systems (**APSys**) 2015
(Acceptance rate: 29.9%)

[C-18] Practical, Real-time Centralized Control for CDN-based Live Video Delivery
Matthew K. Mukerjee, David Naylor, Junchen Jiang, **Dongsu Han**, Srinivasan Seshan, Hui Zhang
ACM SIGCOMM 2015 (Acceptance rate: 15.3%)
(Initiated the project while Dongsu Han was a post-doc fellow at Carnegie Mellon)

[C-17] Accurate Latency-based Congestion Feedback for Datacenters
Changhyun Lee*, Chunjong Park+, Keon Jang#, Sue Moon, **Dongsu Han**
In proceedings of the **USENIX** Annual Technical Conference (**ATC**) 2015 (Acceptance rate: 15.8%)
(*Co-advised student with Sue Moon, +Undergrad student advised, #Post-doc advised)

[C-16] Information-Agnostic Flow Scheduling for Commodity Data Center
Wei Bai, Li Chen, Kai Chen, **Dongsu Han**, Chen Tian, Weicheng Sun
In proceedings of the **USENIX NSDI** (Symposium on Networked Systems Design and Implementation) 2015 (Acceptance rate: 19.7%)

[C-15] Guaranteeing Deadlines for Inter-Datacenter Transfers
Hong Zhang, Kai Chen, Wei Bai, **Dongsu Han**, Chen Tian, Hao Wang, Haibing Guan, Ming Zhang
In proceedings of the ACM European Conference on Computer Systems (**Eurosys**) 2015
(Acceptance rate: 20.7%)

[C-14] PIAS: Practical Information-Agnostic Flow Scheduling for Data Center Networks
Wei Bai, Li Chen, Kai Chen, **Dongsu Han**, Chen Tian, Weicheng Sun
In proceedings of the ACM Workshop on Hot Topics in Networks (**HotNets**) 2014
(Acceptance rate: 22%)

[C-13] MICA: A Holistic Approach to Near-Line-Rate In-Memory Key-Value Caching on General-Purpose Hardware
Hyeontaek Lim, **Dongsu Han**, David G. Andersen, Michael Kaminsky
In proceedings of the **USENIX NSDI** (Symposium on Networked Systems Design and Implementation) 2014 (Acceptance rate: 17.8%)

[C-12] mTCP: a Highly Scalable User-level TCP Stack for Multicore Systems
EunYoung Jeong, Shinae Woo, Muhammad Asim Jamshed, Haewon Jeong, Sunghwan Ihm, **Dongsu Han**, Kyoungsoo Park
In proceedings of the **USENIX NSDI** *(Symposium on Networked Systems Design and Implementation)* 2014 (Acceptance rate: 17.8%)
NSDI community award

[C-11] Understanding Tradeoffs in Incremental Deployment of New Network Architectures
Matthew Mukerjee, **Dongsu Han**, Srinivasan Seshan, and Peter Steenkiste.
In proceedings of the International Conference on emerging Networking EXperiments and Technologies (**ACM CoNEXT**) 2013 (Acceptance rate 20.2%)

[C-10] FCP: A Flexible Transport Framework for Accomodating Diversity

Dongsu Han, Robert Grandl, Aditya Akella, and Srinivasan Seshan.
In proceedings of the **ACM SIGCOMM** 2013 (Acceptance rate 15.8%)

[C-9] CAMEO: A Middleware for Mobile Advertisement Delivery
Azeem J. Khan, Kasthuri Jayarajah, **Dongsu Han**, Archan Misra, Rajesh Balan, and Srinivasan Seshan.
In proceedings 11th **ACM MobiSys** (International Conference on Mobile Systems, Applications, and Services), 2013 (Acceptane Rate: 15.7%)

[C-8] RPT: Re-architecting Loss Protection for Content-Aware Networks
Dongsu Han, Ashok Anand, Aditya Akella, and Srinivasan Seshan.
In proceedings of the 9th **USENIX NSDI** (Symposium on Networked Systems Design and Implementation), 2012 (Acceptance rate: 17.8%)

[C-7] XIA: Efficient Support for Evolvable Internetworking
Dongsu Han, Ashok Anand, Fahad Dogar, Boyan Li, Hyeontaek Lim, Michel Machado, Arvind Mukundan, Wenfei Wu, Aditya Akella, David G. Andersen, John W. Byers, Srinivasan Seshan, and Peter Steenkiste.
In proceedings of the 9th **USENIX NSDI** (Symposium on Networked Systems Design and Implementation), 2012 (Acceptance rate: 17.8%)

[C-6] XIA: An Architecture for an Evolvable and Trustworthy Internet
Ashok Anand, Fahad Dogar, **Dongsu Han**, Boyan Li, Hyeontaek Lim, Michel Machado, Wenfei Wu, Aditya Akella, David G. Andersen, John W. Byers, Srinivasan Seshan, and Peter Steenkiste.
In proceedings of the tenth ACM Workshop on Hot Topics in Networks (**HotNets**), November, 2011 (Acceptance rate: 20%)

[C-5] The Hare and the Tortoise: Tackling Wireless Losses by Exploiting Wired Reliability
Anirudh Badam, **Dongsu Han**, Dave Andersen, Michael Kaminsky, Dina Papagiannaki, and Srinivasan Seshan.
In proceedings 12th **ACM MobiHoc** (International Symposium on Mobile Ad Hoc Networking and Computing, May 2011 (Acceptance rate: 19.7%)

[C-4] Predicting Handoffs in 3G Networks
Umar Javed, **Dongsu Han**, Ramon Caceres, Jeffery Pang, Srinivasan Seshan, and Alexander Varshavsky.
ACM Operating Systems Review (OSR) 45(3): 65-70, January 2012
Also appears in proceedings of the third ACM SOSP Workshop on Networking, Systems, and Applications on Mobile Handhelds (**MobiHeld**), October 2011

[C-3] ATLAS: A Scalable and High-Performance Scheduling Algorithm for Multiple Memory Controllers
Yoongu Kim, **Dongsu Han**, Onur Mutlu, and Mor Harchol-Balter.
In proceedings of the 16th **IEEE HPCA** (International Symposium on High-Performance Computer Architecture), January, 2010 (Acceptance rate: 18%; one of the four papers nominated for the Best Paper Award)

[C-2] Access Point Localization using Local Signal Strength Gradient
Dongsu Han, David G. Andersen, Michael Kaminsky, Konstantina Papagiannaki, and Srinivasan Seshan.
In proceedings of the Passive Active Measurement Conference (**PAM**), April 2009 (Acceptance rate: 28.6%)

[C-1] Mark-and-Sweep: Getting the Inside Scoop on Neighborhood Networks
Dongsu Han, David G. Andersen, Michael Kaminsky, Konstantina Papagiannaki, and Srinivasan Seshan. In proceedings of the **ACM IMC** (Internet Measurement Conference), October 2008 (Acceptance rate: 17.3%)

Journal Publications

[J-14] Low-Overhead Intra-Host Container Communication with Hardware Offloading
Qiang Su, Zhixiong Niu, Ran Shu, Peng Cheng, yongqiang Xlong, Dongsu Han, Chun Jason Xue, and Hong Xu
IEEE/ACM Transactions on Networking 2025

[J-13] Efficient Disaggregated Cloud Storage for Cold Videos with Neural Enhancement
Jinyeong Lim, Juncheol Ye, Jaehong Kim, Hwijoon Lim, Hyunho Yeo, Junhyeok Jan, Myoungsoo Jung, and Dongsu Han
IEEE Micro 2025

[J-12] Graph Neural Network-based SLO-aware Proactive Resource Autoscaling Framework for Microservices
Jinwoo Park, Byungkwon Choi, Chunghan Lee, and Dongsu Han
IEEE/ACM Transactions on Networking 2024

[J-11] Scalable and Secure Virtualization of HSM with ScaleTrust
Juhyeng Han, Insu Yun, Seongmin Kim, Taesoo Kim, Sooel Son, and Dongsu Han
IEEE/ACM Transactions on Networking 2022

[J-10] Congestion Control for Cross-Datacenter Networks
Gaoxiong Zeng, Wei Bai, Ge Chen, Kai Chen, Dongsu Han, Yibo Zhu; Lei Cui
IEEE/ACM Transactions on Networking 2022

[J-9] NetKernel: Making Network Stack Part of the Virtualized Infrastructure
Zhixiong Niu (Microsoft Research), Peng Cheng (Microsoft Research), Yongqiang Xiong (Microsoft Research), **Dongsu Han** (KAIST), Keith Winstein (Stanford University), Chun Jason Xue, Hong Xu (City University of Hong Kong)
IEEE/ACM Transactions on Networking 2022 Vol 30 No. 3

[J-8] BWA-MEME: BWA-MEM emulated with a machine learning approach
Youngmok Jung and **Dongsu Han**
Bioinformatics Mar 2022

[J-7] A Secure Middlebox Framework For Enabling Visibility Over Multiple Encryption Protocols
Juhyeng Han, Seongmin Kim, Daeyang Cho, Byungkwon Choi, Jaehyeong Ha, Dongsu Han
IEEE/ACM Transactions on Networking 2020 Vol 28 No. 6

[J-6] SGX-Tor: A Secure and Practical Tor Anonymity Network with SGX Enclaves
Kim, Seongmin; Han, Juhyeng; Ha, Jaehyeong; Kim, Taesoo; Han, Dongsu
IEEE/ACM Transactions on Networking 2018 Vol. 26 No. 5

[J-5] Expeditus: Congestion-Aware Load Balancing in Clos Data Center Networks
Peng Wang, Hong Xu, Xhixiong Niu, **Dongsu Han,** Yongqiang Xiong
IEEE/ACM Transactions on Networking 2017 Vol. 25 No. 5

[J-4] PIAS: Practical Information-Agnostic Flow Scheduling for Commodity Data Centers
Wei Bai, Li Chen, Kai Chen, **Dongsu Han**, Chen Tian, Hao Wang
IEEE/ACM Transactions on Networking 2017 Vol. 25 No.4

[J-3] DX: Latency-based Congestion Control for Datacenters
Changhyun Lee, Chunjong Park, Keon Jang, Sue Moon, **Dongsu Han**
IEEE/ACM Transactions on Networking 2017 Vol. 25 No.1

[J-2] Guaranteeing Deadlines for Inter-Datacenter Transfers
Hong Zhang, Kai Chen, Wei Bai, **Dongsu Han**, Chen Tian, Hao Wang, Haibing Guan, Ming Zhang
IEEE/ACM Transactions on Networking 2017 Vol. 25 No.1

[J-1] XIA: architecting a more trustworthy and evolvable internet
David Naylor, Matthew K. Mukerjee, Patrick Agyapong, Robert Grandl, Ruogu Kang, Michel Machado, Stephanie Brown, Cody Doucette, Hsu-Chun Hsiao, **Dongsu Han**, Tiffany Hyun-Jin Kim, Hyeontaek Lim, Carol Ovon, Dong Zhou, Soo Bum Lee, Yue-Hsun Lin, Colleen Stuart, Dan Barrett, Aditya Akella, David Andersen, John Byers, Laura Dabbish, Michael Kaminsky, Sara Kiesler, John Peha, Adrian Perrig, Srinivasan Seshan, Marvin Sirbu, and Peter Steenkiste
ACM SIGCOMM Computer Communication Review, Volume 44 Issue 3, pp. 50-57, July 2015.

Other Publications

[O-1] Application-specific Acceleration Framework for Mobile Applications
Byungkwon Choi, Jeongmin Kim, **Dongsu Han**
In proceedings of the **ACM SIGCOMM** 2016 (poster session)

[O-2] Extractocol: Automatic Extraction of Application-level Protocol Behaviors for Android Applications
Hyunwoo Choi*, Jeongmin Kim*, Hyunwook Hong, Yongdae Kim, Jonghyup Lee, and Dongsu Han
In proceedings of the **ACM SIGCOMM** 2015 (poster session) (*co-first authors)

[O-3] A Case for a Stateful Middlebox Networking Stack
Muhammad Jamshed, Donghwi Kim, YoungGyoun Moon, Dongsu Han, and KyoungSoo Park
In proceedings of the **ACM SIGCOMM** 2015 (poster session)

[O-4] Supporting Network Evolution and Incremental Deployment with XIA (demo)
Robert Grandl, **Dongsu Han**, Suk-Bok Lee, Hyeontaek Lim, Michel Machado, Matthew Mukerjee, and David Naylor.
In proceedings of the **ACM SIGCOMM** (Demo session) 2012, Helsinki, Finland

[O-5] Hulu in the Neighbhorhood (Invited Paper)
Dongsu Han, David Andersen, Michael Kaminsky, Konstantina Papagiannaki, and Srinivasan Seshan
In proceedings of the Conference on COMmunication Systems and NETworkS (**COMSNETS**), 2011

SOFTWARE ARTIFACTS PUBLISHED

1. TopFull: An Adaptive Top-Down Overload Control for SLO-Oriented Microservices (https://github.com/kaist-ina/TopFull)
2. StellaTrain: Accelerating Model Training in Multi-cluster Environments with Consumer-grade GPUs (https://github.com/kaist-ina/stellatrain)

3. ES-MoE: Scaling Beyond the GPU Memory Limit for Large Mixture-of-Experts Model Training (https://github.com/kaist-ina/es-moe)
4. NeuroScaler: Neural Enhancement at Scale (https://github.com/kaist-ina/engorgio-public)
5. TsPipe: Learn from Teacher Faster with Pipelines (https://github.com/kaist-ina/TSPipe)
6. Faster BWA-MEM2 using learned-index (https://github.com/kaist-ina/BWA-MEME)
7. Neural-enhanced Video Streaming on Commodity Mobile Devices (https://github.com/kaist-ina/nemo)
8. Neural Adaptive HTTP Video Streaming (https://github.com/kaist-ina/NAS_public)
9. ExpressPass simulation code (https://github.com/kaist-ina/ns2-xpass)
10. SGX-Tor: Intel SGX-enabled Tor anonymity network (https://github.com/kaist-ina/SGX-Tor/)
11. Extractocol: Automatic protocol behavior analysis for Android application (https://github.com/kaist-ina/Extractocol_public)
12. mOS: Framework for Middlebox Development (https://github.com/ndsl-kaist/mOS-networking-stack)
13. DFC: High-speed string pattern matching library (https://github.com/nfsp3k/DFC)
14. OpenSGX: Open-source Intel SGX emulator (https://github.com/sslab-gatech/opensgx)
15. Belief Propagation-based parallel optimization tool (https://github.com/kaist-ina/bp_solver)
16. MemScope: memory duplication analysis tool for x86-android (https://github.com/kaist-ina/MemScope)
17. mTCP: high-performance user-level TCP stack for multicore systems (http://shader.kaist.edu/mtcp/)
18. XIA: eXpressive Internet Architecture (https://github.com/XIA-Project/xia-core/)

SERVICES AND PROFESSIONAL ACTIVITIES

Associate Editor:

- IEEE/ACM Transactions on Networking (2021-)
- Proceedings of the ACM on Networking
-

PC/Workshop Chair:

- IEEE ICNP 2025 (General Chair)
- ACM CoNEXT 2020 (PC chair)
- ACM APNet 2019 (PC chair)
- ACM KBNets 2018 (workshop chair)

Program Committee:

- USENIX OSDI 2024, 2026
- ACM SIGCOMM 2019, 2020, 2022-25
- USENIX NSDI 2018, 2021, 2023, 2024
- ACM CoNEXT 2016, 2017, 2020, 2022-24
- ACM APNet 2018-2024
- ACM HotNets 2018, 2019
- ACM/IEEE SEC 2019
- ACM KBNets 2018 (co-chair)
- ITC 29
- SysTEX workshop 2017
- IEEE INFOCOM 2016
- IEEE ICNP 2015
- ACM ANCS 2015, 2016, 2017
- ACM APSys 2016, 2017
- IEEE LANMAN 2014-2016
- PAM 2015
- HotMiddlebox 2016 (co-chair), 2015

Reviewer

- IEEE/ACM Transactions on Networking
- Journal of Communications and Networks

Professional services:

- APNet steering committee member
- ACM Mobisys 2019 Poster Chair
- ACM SIGCOMM 2018 SRC Juror
- Future Internet Summit 2018 PC Chair
- USENIX NSDI 2018 Poster Chair
- ACM SIGCOMM 2018 KBNets Chair
- APNet 2017 Publication chair
- ACM CoNEXT 2017 Publication chair
- ACM SIGCOMM 2016 Poster PC
- CFI 2015 Web chair
- APSys 2015 Poster chair

TEACHING AND MENTORING

Korea Advanced Institute of Science and Technology, Daejeon, Korea:

Contribution in undergraduate education

- Offered four different undergraduate courses in computer division in the School of EE
- Developed two new graduate courses and redefined and renamed EE324
- Consistently achieved high evaluation ratings

EE793/AI703 Systems and Applications of Artificial Intelligence and Machine Learning
- Spring 2020: 10 students, evaluation rating 4.80/5.0

EE618 Advanced Computer Networks and Cloud Computing
- Fall 2016: 11 students, evaluation rating 4.85/5.0 (School of EE Teaching Award)
- Spring 2019: 8 students, evaluation rating 4.92/5.0
- Spring 2021: 12 students, evaluation rating 4.19/5.0

EE415 Operating Systems and System Programming (given in English)
- Spring 2015: 18 students, evaluation rating 4.42/5.0
- Spring 2016: 18 students, evaluation rating 4.41/5.0
- Spring 2017: 17 students, evaluation rating 4.18/5.0
- Spring 2018: 30 students, evaluation rating 4.41/5.0

EE209 Programming Structures for Electrical Engineering (given in English)
- Fall 2014: 84 students, evaluation rating 4.15/5.0
- Fall 2017: 58 students, evaluation rating 4.06/5.0
- Fall 2018: 81 students, evaluation rating 4.07/5.0
- Fall 2019: 33 students, evaluation rating 4.26/5.0
- Spring 2022: 50 students, evaluation rating 4.21/5.0

EE323 Computer Networks (given in English)
- Spring 2014: 27 students, evaluation rating 4.24/5.0

EE324 Introduction to Cloud Computing (formerly Network Programming)
- Fall 2013: 10 students, evaluation rating 4.67/5.0
- Fall 2015: 21 students, evaluation rating 4.38/5.0
- Fall 2020: 31 students, evaluation rating 4.17/5.0
- Fall 2021: 6 students, evaluation rating 4.80/5.0

IS511 Introduction to Information Security (co-teaching with 3 other instructors, given in Korean)
- Spring 2015: 30 students, evaluation rating 4.24/5.0
- Spring 2016: 14 students, current semester 4.03/5.0

EE5505 Electronics Design Lab. (co-teaching with 3 other instructors)
- Fall 2015: 73 students, evaluation rating 3.71/5.0

Carnegie Mellon University (Teaching Assistant):

- Advanced and Distributed Operating Systems (15-712), Carnegie Mellon University, 2011

- Distributed Systems (15-446), Carnegie Mellon University, 2009

Students Supervised/Under-supervision:

Ph.D graduates:

Jinwoo Park (Ph.D. 2025)
Jaehong Kim (Ph.D. 2024, currently at Postdoctoral Researcher at Carnegie Mellon University)
Hwijoon Lim (Ph.D. 2024, currently at Meta)
Youngmok Jung (Ph.D. 2024, currently at Genome Insight)
Hyunho Yeo (Ph.D. 2023, currently at Meta)
Jungmin Kim (Ph.D. 2023, currently at PiLab Technology)
Juyung Han (Ph.D. 2022, currently at SAP Labs Korea)
Byoungkwon Choi (Ph.D. 2021, currently at Samsung Electronics, MX division, Cloud Team)
Seongmin Kim (Ph.D. 2019, currently an assistant professor at Sungshin Women's University)
Changhyun Lee (Ph.D. 2015, now at ETRI, Korea. Co-advised with Sue Moon)

Post-Docs/visiting scholar:

Keon Jang, 2014

Current Ph.D students:

Juncheol Ye, Jaehyung Park, Yoonhun Lee, Jinyeong Lim

M.S graduates:

Seyoung Kim, Yoonhun Lee, Yechan Kim, Uitaek Hong
Juncheol Ye, Jaehong Kim, Junhyeok Lee
Ngnoc-Quang Nguyen, Daeyang Cho, Juyung Han
Hejing Li (Currently a Ph.D student at MPI-SWS)
Inho Cho (M.S. 2017, now at MIT EECS Ph.D. program)
Woohyun Choi (M.S. 2017, now at TMaxSoft)
Jungmin Kim (M.S. 2016)
Byoungkwon Choi (M.S. 2016)
Byeoksan Lee (M.S. 2017, now at Naver LINE)

AWARDS AND HONORS

Gold award, Samsung Human Tech Paper Award 2022 (Advisor)
Research Innovation Award 2018, College of Engineering, KAIST
KAIST Breakthroughs 2018
NSDI 2017 Best Paper Award
KAIST EE Teaching Award 2017
Silver award, Samsung Human Tech Paper Award 2016 (Advisor)
NSDI 2014 Community Award

SELECTED (INVITED) LECTURES/TALKS

- NMS Seminar, EECS at MIT, Apr. 2024
- Computer Science Department of New York University, Apr. 2024
- Computer Science Department of University of Southern California, Dec. 2023
- Departmental seminar at Computer Science Department of Computer Science of University of California, Irvine Dec. 2023
- Department of Computer Science and Engineering, Seoul National University, 2023
- Departmental seminar at Computer Science Department of Chinese University of Hong Kong, Mar 2022
- Invited talk at Korea Symposium for Telemedicine, Nov 2021
- Invited talk at University of Wisconsin-Madison, Feb 2021
- Invited talk at HSN, Korea. 2020
- Invited talk at KIISE SIGCS Winter Workshop 2019
- Invited talk at UC Berkeley NETSYS Lab 2019
- School of Electrical and Electronic Engineering, Yonsei University, 2018
- CBS Deajon Live Radio Interview, 2018
- Department of Computer Science and Engineering, Seoul National University, 2018
- 4th Industrial Revolution Frontier Leadership Program, Lecturer, Fall 2018
- 4th Industrial Revolution Frontier Leadership Program, Lecturer, Spring 2018
- Invited talk at MPEG New Media Forum 2018, Korea
- Invited talk at SK Telecom, 2018
- Invited talk at National Security Research Institute, 2018
- KAIST-Samsung Research Future Technology Workshop, 2018
- S&T Biz Colloquium, KAIST College of Business, 2018
- Invited talk at Conviva Inc., USA, 2017
- Invited talk, APNet 2017
- Invited lecture at Security@KAIST workshop, 2017
- Invited talk at Samsung Electronics DS division, 2017
- Invited talk at ETRI, 2017
- 4th Industrial Revolution Frontier Leadership Program, Lecturer, Fall 2017
- 4th Industrial Revolution Frontier Leadership Program, Lecturer, Spring 2017
- SK Hynix-KAIST 4th Industrial Revolution Frontier Leadership Lecture, 2017
- Schloss Dagstuhl Seminar on Network Latency Control in Data Centres, 2016
- Invited talk at Samsung Electronics DS division, 2016
- Keynote, A3 Foresight Program, Japan, 2016
- ACM HotNets 2015
- Invited talk at National Security Research Institute, 2015
- Invited talk at International Conference on ICT Convergence 2015
- Interdisciplinary Information Sciences (IIIS), Tsinghua University 2015
- KRNET 2016, 2015, 2014, 2013
- Computer Science Department Colloquium, City University of Hong Kong, 2015
- Invited talk at Computer Science Department, HKUST 2015
- Invited talk at Samsung Electronics DS division, 2014
- Graduate School of Information Security, KAIST 2014
- Invited talk at Computer Science Department, HKUST 2014
- Invited talk at Computer Science Department, POSTECH 2014
- Invited talk at Computer Science Department, Seoul National University 2014
- Invited talk at KIISE SIGCS Winter Workshop 2014

- Invited talk at Information Engineering Department, Chinese University of Hong Kong 2013
- Invited talk at ASIA FI Summer School 2013

PATENTS GRANTED

* International patents are listed only.

U.S. Patent 10,645,425 "Method and device for managing multimedia data", 2020.05.05
U.S. Patent 10,560,731: "Server apparatus and method for content delivery based on content-aware neural network", 2020.02.11
U.S. Patent 15789361: "Apparatus and method for training a learning system to detect event", 2020.05.12
U.S. Patent 10452405: "Method and apparatus for accelerating loading of mobile application content", 2019.10.22
U.S. Patent 15008966: "Multi-pattern matching algorithm and processing apparatus using the same", 2019.10.29

GRANTS/RESEARCH FUNDS

Government funding sources:
- Institute for Information & communication Technology Planning & evaluation (IITP), 2014-2022
- Korea Institute of Science and Technology (KISTI), 2021-2022
- National Research Foundation of Korea, 2013-2015, 2018-2019
- Institute of Civil-Military Technology Cooperation (ICMTC), 2018-2021
- Electronics and Telecommunications Research Institute (ETRI), 2017, 2020
- Office of Naval Research Global (ONRG), 2016
- Asian Office of Aerospace Research and Development (AOARD), 2014-2015

Industry funding sources:
- Samsung Electronics, 2013, 2018-2022
- INUC, 2022
- LG U+, 2022
- KB Capital, 2017, 2019, 2020
- SK Telecom, 2013
- Microsoft, 2016
- Fujitsu Labs, 2019
- Toyota Motor Corporation, 2020-2021

INDUSTRY CONSULTING/REACH OUT

Demonstrated technical leadership through:

- Tech transfer: Licensed U.S. Patent 15789361: "Apparatus and method for training a learning system to detect event", to a start-up
- Short-term technical consulting: Samsung Electronics
- Technical consulting: KB Capital, Genome Insight
- Consultant and Panel for SK Hynix CREATE forum for C-level Executives
- Instructor/lecturer for Seongnam City-KAIST 4th Industrial Revolution Leadership Forum
- Instructor/lecturer for 4th Industrial Revolution Leadership Program
- Instructor/lecturer for SK-Hynix-KAIST 4th Industrial Revolution Leadership Lecture Series