Hyungsoo Jung

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Research Interests

The primary research focuses on **database-oriented operating systems (DBOS)** designed for AI/ML applications and hybrid transactional/analytical processing (HTAP) workloads. Key areas of interest include developing scalable and efficient DBOS systems optimized for exceptional processing speeds. Additionally, we explore system architectures that enable **distributed, data-parallel computing** to support scalable deep learning frameworks effectively.

Education

Seoul National University — *Seoul, South Korea*

Ph.D. in Computer Science and Engineering (advisor: Prof. Heon Y. Yeom) — *Mar 2004 - Aug 2009*

- Study on end-to-end Internet congestion control for high bandwidth-delay product networks.

Seoul National University — *Seoul, South Korea*

M.S. in Computer Science and Engineering (advisor: Prof. Heon Y. Yeom) — *Mar 2002 - Feb 2004*

- Study on soft real-time operating systems.

Korea University — *Seoul, South Korea*

B.S. in Mechanical Engineering — *Mar 1995 - Feb 2002*

- Mandatory military service: Dec 1998 - Feb 2001.

Employment History

Seoul National University — *Seoul, South Korea*

Full Professor in Graduate School of Data Science — *Mar 2024 - present*

- Database-oriented operating systems (DBOS) - DB and OS synergies for data-centric systems
- Distributed data-parallel computing for scalable AI systems

Hanyang University — *Seoul, South Korea*

Full Professor in Computer Science — *Sep 2015 - Feb 2024*

- Research on new directions towards database operating systems for large-scale data management
- Research on MVCC database systems for hybrid transactional/analytical processing workloads
- Research on high-performance relational databases and key-value storage on new memory technologies

Amazon Web Services — *Seattle, WA, USA*

Sr. Software Development Engineer (a founding member of Amazon Aurora Database) — *Oct 2012 - Aug 2015*

- Developed high-performance transaction processing in Amazon Aurora

National ICT Australia — *Kensington, NSW, Australia*

Researcher (Research group leader: Prof. Gernot Heiser at UNSW) — *Apr 2012 - Sep 2012*

- Developled a scalable transaction locking system for multicore hardware

The University of Sydney — *Sydney, NSW, Australia*

Postdoctoral researcher (Postdoc advisor: Prof. Alan Fekete) — *Apr 2010 - Apr 2012*

- Developled a tight theorem for serializable snapshot isolation for replicated snapshot databases

Professional Services and Research/Teaching Excellence

2026	**Program Committee Member**, ACM SIGMOD Conference 2026	*Bengaluru, India*
2025	**Program Committee Member**, ACM SIGMOD Conference 2025	*Berlin, Germany*
2025	**Program Committee Member**, VLDB Conference 2025	*London, UK*
2022	**Best Teacher Award**, Hanyang University	*South Korea*
2022	**Program Committee Member**, IEEE ICDE 2022	*Malaysia*
2021	**Program Committee Member**, ACM SIGMOD Conference 2021	*Xian, China*
2021	**Best Paper Honorable Mention Award**, ACM SIGMOD Conference 2021	*Xian, China*
2019	**Best Teacher Award**, Hanyang University	*South Korea*
2013	**One of the Four Best Papers**, ACM SIGMOD Conference 2013	*New York, USA*

Selected (Top-tier) Publications († - equal contribution)

Rapid Data Ingestion through DB-OS Co-design — *ACM SIGMOD 2025*

Kyeongmin Lim†, Minseok Yoon†, Kihwan Kim†, Alan Fekete, **Hyungsoo Jung** — *June 2025*

Deploying Computational Storage for HTAP DBMSs Takes More Than Just Computation Offloading — *VLDB 2023*

Kitaek Lee†, Insoon Jo†, Jaechan Ahn†, Hyuk Lee, Hwang Lee, Woong Sul, **Hyungsoo Jung** — *August 2023*

Diva: Making MVCC Systems HTAP-Friendly — *ACM SIGMOD 2022*

Jongbin Kim†, Jaeseon Yu†, Jaechan Ahn, Sooyong Kang, **Hyungsoo Jung** — *June 2022*

Rethink the Scan in MVCC Databases — *ACM SIGMOD 2021*

Jongbin Kim†, Kihwang Kim†, Hyunsoo Cho, Jaeseon Yu, Sooyong Kang, **Hyungsoo Jung** — *June 2021*

- This paper received **ACM SIGMOD 2021 Honorable Mention Award** (8 out of 209 accepted papers).
- `https://2021.sigmod.org/sigmod_best_papers.shtml`

Long-lived Transactions Made Less Harmful — *ACM SIGMOD 2020*

Jongbin Kim, Hyunsoo Cho, Kihwang Kim, Jaeseon Yu, Sooyong Kang, **Hyungsoo Jung** — *June 2020*

Border-Collie: A Wait-free, Read-optimal Algorithm for Database Logging on Multicore Hardware — *ACM SIGMOD 2019*

Jongbin Kim, Hyeongwon Jang, Seohui Son, Hyuck Han, Sooyong Kang, **Hyungsoo Jung** — *June 2019*

Pay Migration Tax to Homeland: Anchor-based Scalable Reference Counting for Multicores — *USENIX FAST 2019*

Seokyong Jung, Jongbbin Kim, Minsoo Ryu, Sooyong Kang, **Hyungsoo Jung** — *February 2019*

Scalable Database Logging for Multicores — *VLDB 2018*

Hyungsoo Jung, Hyuck Han, Sooyong Kang — *August 2018*

TCPRand: Randomizing TCP Payload Size for TCP Fairness in Data Center Networks — *IEEE INFOCOM 2015*

Soojeon Lee, Myungjin Lee, Dongman Lee, **Hyungsoo Jung**, Byoung-Sun Lee — *May 2015*

A Scalable Lock Manager for Multicores — *ACM TODS*

Hyungsoo Jung, Hyuck Han, Alan Fekete, Gernot Heiser, Heon Y. Yeom — *December 2014*

- This article is an extended version of the SIGMOD'13 paper.

Scalable Serializable Snapshot Isolation for Multicore Systems — *IEEE ICDE 2014*

Hyuck Han, SeongJae Park, **Hyungsoo Jung**, Alan Fekete, Uwe Roehm — *April 2014*

A Scalable Lock Manager for Multicores

ACM SIGMOD 2013

Hyungsoo Jung, Hyuck Han, Alan Fekete, Gernot Heiser, Heon Y. Yeom — *June 2013*

- This paper is selected as **one of the four best papers** and invited to ACM Transactions on Database Systems (TODS).
- Forward message: `https://dl.acm.org/doi/abs/10.1145/2697050`
- The key ideas are **fully commercialized** as transaction locking systems in Amazon Aurora Databases.

Serializable Snapshot Isolation for Replicated Databases in High-Update Scenarios

VLDB 2011

Hyungsoo Jung, Hyuck Han, Alan Fekete, Uwe Roehm — *August 2011*

Adaptive Delay-based Congestion Control for High Bandwidth-Delay Product Networks

IEEE INFOCOM 2011

Hyungsoo Jung, Shin-Gyu Kim, Heon Y. Yeom, Sooyong Kang, Lavy Libman — *April 2011*