

# Sejin Hwang

sourkey6077@gmail.com — +82 10 5859 1721 — Github — Homepage

## RESEARCH INTERESTS

---

My research interests lie at the intersection of scalability, security, and decentralization in distributed systems. I focus on advancing blockchain sharding mechanisms and consensus algorithms to overcome the practical barriers in deploying large-scale decentralized systems without compromising their core properties of security and decentralization.

## EDUCATION

---

**Hanyang University**, Seoul, Republic of Korea

Candidate for Master of Science in Computer Software Engineering

Advisor: Minsoo Ryu

Mar 2024 — Present

GPA: 4.5/4.5 (overall), 4.5/4.5 (major)

**Hanyang University**, Seoul, Republic of Korea

Bachelor of Science in Computer Software Engineering

Mar 2018 — Feb 2024

GPA: 4.14/4.5 (overall), 4.24/4.5 (major)

**The University of Texas at Austin**, Austin, TX, USA

Exchange Student in Computer Science

Aug 2022 — Dec 2022

## PUBLICATIONS

---

### Conference paper

- **Hwang, S.**, Kim, H., and Ryu, M. (2026). CinderShard: A Byzantine-Resilient Sharding Architecture with Decoupled Safety and Liveness. *Submitted to the 41st ACM/SIGAPP Symposium on Applied Computing*. (Under review)
- Ryu, M., **Hwang, S.**, Choi, C., Jung, H., and Kang, S. (2025). Unishard: A Scalable Byzantine Sharding Protocol. *Submitted to SIGMOD International Conference on Management of Data*. (Submitted)

## RESEARCH EXPERIENCE

---

**Operating Systems and Distributed Computing Laboratory, Hanyang University**

*Research Assistant*

Seoul, Republic of Korea

Mar 2024 — Present

- Proposed CinderShard, a Byzantine-resilient sharding architecture that simultaneously achieves robustness against single-shard attacks and high scalability by decoupling the two fundamental properties of consensus—safety and liveness—and addressing each independently. CinderShard achieves 4.29× improvement in throughput and a 5.26× reduction in latency compared to baseline protocols.
- Implemented Unishard, a scalable Byzantine sharding protocol that finalizes cross-shard transaction batches within three consensus rounds by replicating and executing them as complete units. Unishard achieves 13.16× reduction in cross-shard transaction latency and 4.16× throughput improvement compared to the state-of-the-art Byzantine sharding protocols.
- Designed a lightweight shard reconfiguration mechanism that eliminates data migration overhead by decoupling data maintenance from the consensus process, achieving robustness against adaptive Byzantine adversaries without sacrificing the inherent scalability of the sharding architecture.
- Developed a static analysis tool for Solidity smart contracts to identify read/write sets of Ethereum transactions, enabling parallel transaction execution through concurrency control mechanisms.

*Undergraduate Research Intern*

Jan 2023 — Feb 2024

- Led weekly seminars on blockchain scalability solutions, analyzing foundational concepts in fault tolerance and consensus algorithms in distributed systems.
- Conducted a comparative analysis of DAG-based consensus algorithms from DAG-Rider to Shoal, focusing on their high throughput at the cost of latency and the distinct strategies each algorithm employs to address this trade-off.
- Implemented dynamic inscription, a methodology that extends the Ordinals Protocol, enabling persistent storage and management of mutable data structures on Bitcoin network.

**Decipher, Blockchain Research Group of Seoul National University**

*Research Member*

Seoul, Republic of Korea

Sep 2025 — Present

- Leading a research project ("The Sharding Resurrection") that revisits the indispensability of sharding in addressing inherent blockchain scalability limitations and proposes a novel cross-shard architecture, built on top of Ethereum's current roadmap, designed to process arbitrary cross-shard transactions.

## PROFESSIONAL EXPERIENCE

---

### LTCware Inc.

Backend Developer

Seoul, Republic of Korea

Jan 2023 — Present

- Developed a scalable backend architecture for a digital wallet service, enabling real-time synchronization of user transactions and blockchain data across multiple blockchains.
- Managed blockchain nodes including Bitcoin, Ethereum, Solana, Aptos, and Tron, performing comprehensive data analysis to monitor network health and optimize data synchronization.

## TEACHING EXPERIENCE

---

### Hanyang University

Teaching Assistant

- CUL 1122: Creative Programming (Undergraduate, English-only) Fall 2025
- BLC 6001: Introduction to Blockchain and Token Economy (Graduate) Spring 2025
- CUL 0011: Creative Computing (Undergraduate, English-only) Spring 2024 — Fall 2025

## AWARDS AND HONORS

---

### Hanyang HY-IN Scholarship

Graduate Merit Scholarship

Hanyang University

2024 — 2025

### BK21 FOUR Fellowship

Government Fellowship for Advanced Graduate Research

National Research Foundation of Korea

2024 — 2025

### Hanyang University Honor Student Award

Summa Cum Laude

Hanyang University

2024

### 3rd Place in Glitch/Korea Hackathon Avalanche Track

Pic'ket: Dynamic NFT Ticketing Platform

Seoul, Korea

2023

### Hanyang Brain Scholarship

Academic Excellence Scholarship

Hanyang University

2022

## SKILLS

---

- **Distributed Systems:** Sharding, PBFT-based and DAG-based Consensus Algorithm, Concurrency Control, Two-phase Commit and Two-phase Locking
- **Blockchain Core:** EVM, StateDB (Merkle Patricia Trie, LevelDB), Block-STM
- **Cryptography:** Zero-Knowledge Proofs, Commitment Schemes
- **Programming:** C/C++, Go, Solidity, JavaScript
- **Language:** Korean (Native), English (Fluent, TOEFL iBT: 111), Chinese (Conversational)