# Jeonghyeon Kim

Online Profile: jhyeon.kim

Email: jeonghyeon.kim@kaist.ac.kr
ORCID: 0009-0000-7070-3578

## Education

- **Ph.D of Philosophy in Computer Science** — KAIST
  *Supervisor: Prof. Youngjin Kwon* — *February 2026 - Current*
- **Master of Engineering in AI Semiconductor** — KAIST
  *Supervisor: Prof. Jongse Park & Prof. Jeehoon Kang* — *February 2024 - February 2026*
- **Bachelor of Engineering in Computer Science** — University of Seoul
  *Graduated as the Salutatorian (Second Highest Distinction); GPA: 4.26/4.5* — *March 2019 - August 2022*

## Research Interests

- **Concurrent Memory Reclamation in Uncooperative Environments**
  - I focus on designing practical and efficient memory reclamation techniques *for highly concurrent systems.*
  - **Hazard Pointers with Bounded RCU**: I developed a novel SMR scheme that combines classical *Hazard Pointers* with *bounded RCU critical sections*, achieving a better balance between memory footprint and efficiency. This work received a *Best Paper Award* at SPAA 2024.
  - **Ongoing Project**: I am currently developing a lock-free, precise garbage collection library designed for *safety*, *efficiency*, and *seamless integration* into existing systems.
- **Formal Verification of Weakly Consistent Distributed Systems**
  - I focus on creating practical methodologies for formally verifying weakly consistent distributed systems, *ensuring both safety and liveness properties.*
  - **Ongoing Project**: I am contributing to a novel top-down verification framework based on Rocq and Goose, collaborating with Northeastern and Yonsei University. My role was to define and prove key *liveness properties*. Specifically, I focused on convergence and availability, developing what we believe is *the first formalization and verification of availability*—ensuring clients get a timely response—in the context of weakly consistent systems.

## Publication

- **Compositional Model-Driven Verification of Weakly Consistent Distributed Systems**
  Bryant J. Curto, Jeonghyeon Kim, Alan Wang, Gijung Im, Jieung Kim, Jeehoon Kang, Ji-Yong Shin.
  PLOS 2025; *[DOI]*, October 2025
- **Leveraging Immutability to Validate Hazard Pointers for Optimistic Traversals**
  Janggun Lee, Jeonghyeon Kim, Jeehoon Kang.
  PLDI 2025; *[DOI]*, June 2025
- **Expediting Hazard Pointers with Bounded RCU Critical Sections**
  Jeonghyeon Kim, Jaehwang Jung, Jeehoon Kang. **Best Paper Award**.
  SPAA 2024; *[DOI]*, June 2024
- **Concurrent Immediate Reference Counting**
  Jaehwang Jung, Jeonghyeon Kim, Matthew J. Parkinson, Jeehoon Kang.
  PLDI 2024; *[DOI]*, June 2024
- **Applying Hazard Pointers to More Concurrent Data Structures**
  Jaehwang Jung, Janggun Lee, Jeonghyeon Kim, Jeehoon Kang.
  SPAA 2023; *[DOI]*, June 2023

## Experience

- **AL林 (Allim) - Competitive Programming Club** — School of Computer Science, University of Seoul
  *Club Member / President* — *April 2019 - August 2022*
  - **Led and instructed** weekly online algorithm seminars for club members.
  - **Designed, authored, and verified** problems for the annual **University of Seoul Programming Contest** (UOSPC) for three consecutive years: *[2021]*, *[2020]*, *[2019]*
- **Intelligent Robot Lab.** — School of Computer Science, University of Seoul
  *Research Internship on Engineering* — *December 2020 - June 2021*

## Honors and Awards

- **Best Paper Award** — SPAA 2024
  *For the paper entitled: Expediting Hazard Pointers with Bounded RCU Critical Sections* — *June 2024*
- **Goorm Algorithm Monday Challenge** — Goorm
  *2nd Place* — *December 2022*
- **Salutatorian (Second Highest Distinction)** — University of Seoul, School of Computer Science
  *Awarded for graduating with the second-highest academic standing* — *August 2022*
- **'22 Hyundai Mobis Algorithm Competition** — Hyundai Mobis
  *The Encouragement Award* — *July 2022*
- **The World Embedded Software Contest 2020** — Hyundai & Ministry of Trade, Industry and Energy
  *The Special Award in Auto-driving Car* — *January 2021*
- **Academic Excellence Award** — University of Seoul
  *Top Student in Spring 2020* — *October 2020*