

# Yoel Kim

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## Research

**Vision.** My long-term research vision is to make formal verification *practical*, realizing error-free software.

**Goal.** To this end, I address the *scalability* challenge in formal verification by designing abstraction techniques that *automatically* construct software models that are *efficiently verifiable*.

**Interests.** Currently, I am interested in *data-assisted abstractions*, which leverage dynamic information such as input/output examples, execution traces, and system logs to guide and optimize the abstraction process.

## Education

<i>Ph.D. in Computer Science and Engineering, Kyungpook National University</i>	<i>Mar 2023 – Feb 2027 (expected)</i>
○ Advisor: Yunja Choi	
<i>M.S. in Computer Science and Engineering, Kyungpook National University</i>	<i>Mar 2021 – Feb 2023</i>
○ Advisor: Yunja Choi	
○ Thesis: An automated stub generation approach using program synthesis for software verification	
<i>B.S. in Computer Science and Engineering, Kyungpook National University</i>	<i>Mar 2017 – Feb 2021</i>

## Publications

1. LLM-Based State Machine Generation Technique for Reactive Systems and Its Performance Evaluation  
Seungbin Choi, Yoel Kim, and Yunja Choi  
**KCSE 2026:** Korea Conference on Software Engineering
2. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software  
Yoel Kim and Yunja Choi  
**FSE 2024:** ACM International Conference on the Foundations of Software Engineering \* *Top-Tier Conference*
3. An Approach of Incremental Constraint Extraction Based on I/O Examples for Automatic Stub Generation  
Yoel Kim and Yunja Choi  
**KCSE 2023:** Korea Conference on Software Engineering \* *Best Short Paper Award*
4. A Case Study to Improve the Efficiency of Model Checking in Embedded Software Using Program Synthesis  
Yoel Kim and Yunja Choi  
**KSC 2021:** Korea Software Congress
5. A Case Study on the Performance of Program Synthesis in Embedded Software Domain  
Yoel Kim and Yunja Choi  
**KCSE 2021:** Korea Conference on Software Engineering

## Selected Talks

1. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software.  
Top Conference session at KCC 2025. *Jeju, Korea. Jul 4, 2025.*
2. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software.  
Top Conference session at KCSE 2025. *Pyeongchang, Korea. Jan 22, 2025.*
3. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software.  
Research paper presentation at FSE 2024. *Porto de Galinhas, Ipojuca, Pernambuco, Brazil. Jul 17, 2024.*

## Experiences

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### **Teaching Assistant** (at Kyungpook National University):

- ITEC0414: Software Testing Theory (Spring 2022, 2023, 2024).
- COMP0224: Software Design (Fall 2021, 2022).
- COMP0216: Data Structure Applications (Spring 2021).