Yoel Kim

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Research Interests

- Software and its engineering → Formal software verification; Model checking; Embedded software;
- Theory of Computation → Automata over infinite objects; Abstraction.

Education

Ph.D. in Computer Science and Engineering, Kyungpook National University *Mar 2023 – Feb 2027 (Expected)*

- Advisor: Yunja Choi
- Dissertation: Data-Driven Abstraction Techniques for Embedded Software Verification

M.S. in Computer Science and Engineering, Kyungpook National University *Mar 2021 – Feb 2023*

- Advisor: Yunja Choi
- Thesis: An Automated Stub Generation Approach Using Program Synthesis for Software Verification

B.S. in Computer Science and Engineering, Kyungpook National University *Mar 2017 – Feb 2021*

- Track: Global Software Convergence
- GPA: 3.95/4.3; ranked 1st among 13 students in the track

Ongoing Research

1. AutoCL: A Tool for Active Learning of Symbolic Automata from C Programs
   Yoel Kim and Yunja Choi
   TACAS'27: *International Conference on Tools and Algorithms for the Construction and Analysis of Systems* (Regular Tool Papers Track)

2. Learning Functional Specifications from Stateful Control Programs through Active Model Learning
   Yunja Choi and Yoel Kim
   IEEE Access, 2026

3. LLM-Based State Machine Generation Technique for Reactive Systems and Its Performance Evaluation (Extended version of the KCSE'26 paper)
   Seungbin Choi, Yoel Kim, and Yunja Choi
   KIPS Transactions on Software and Data Engineering (KTSDE), 2026

International Conferences

1. Active Learning of Symbolic Automata for Reactive Programs via Dynamic Symbolic Mapper
   Yoel Kim and Yunja Choi
   FSE'26: *ACM International Conference on the Foundations of Software Engineering*

2. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software
   Yoel Kim and Yunja Choi
   FSE'24: *ACM International Conference on the Foundations of Software Engineering*

Domestic Conferences

1. LLM-Based State Machine Generation Technique for Reactive Systems and Its Performance Evaluation
   Seungbin Choi, Yoel Kim, and Yunja Choi
   KCSE'26: *Korea Conference on Software Engineering* * *Short Paper Award*

2. An Approach of Incremental Constraint Extraction Based on I/O Examples for Automatic Stub Generation
   Yoel Kim and Yunja Choi
   KCSE'23: *Korea Conference on Software Engineering* * *Best Short Paper Award*

3. A Case Study to Improve the Efficiency of Model Checking in Embedded Software Using Program Synthesis
   Yoel Kim and Yunja Choi
   KSC'21: *Korea Software Congress*

4. A Case Study on the Performance of Program Synthesis in Embedded Software Domain
   Yoel Kim and Yunja Choi
   KCSE'21: *Korea Conference on Software Engineering*

Talks

1. AutoCL: A Tool for Active Learning of Symbolic Automata from C Programs. 11th STAAR Workshop. *Kyungpook National University, Daegu, Korea. Jul 14, 2026.*
2. Active Learning of Symbolic Automata for Reactive Programs via Dynamic Symbolic Mapper. Research paper presentation. FSE'26. *Concordia University, Montreal, Canada. Jul 7, 2026.*
3. AutoCL: 동적 심볼릭 매퍼 기반 심볼릭 오토마타 능동학습. 10th STAAR Workshop. *Ulsan, Korea. Feb 3, 2026.*
4. 동적 심볼릭 매퍼 기반 심볼릭 오토마타 능동학습. PhD 발표 세션. BK21 참여대학원생 컴퓨터학부 교류 학술대회. *Daegu, Korea. Jan 15, 2026.*
5. C2FSM: A Tool for Active Learning of Extended Finite State Machines from C Programs. 9th STAAR Workshop. *Korea University, Seoul, Korea. Jul 29, 2025.*
6. C2FSM: A Tool for Active Learning of Extended Finite State Machines from C Programs. PhD 발표 세션. BK21 참여대학원생 컴퓨터학부 교류 학술대회. *Daegu, Korea. Jul 21, 2025.*
7. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software. Top Conference session. KCC'25. *Jeju, Korea. Jul 4, 2025.*
8. 프로그램 합성 기법을 이용한 효율적인 능동 모델 학습 방법. Lightning talk. 8th STAAR Workshop. *Yeosu, Korea. Feb 7, 2025.*
9. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software. Top Conference session. KCSE'25. *Pyeongchang, Korea. Jan 22, 2025.*
10. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software. 우수 논문 발표 세션. BK21 참여대학원생 컴퓨터학부 교류 학술대회. *Daegu, Korea. Jan 21, 2025.*
11. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software. Research paper presentation. FSE'24. *Porto de Galinhas, Ipojuca, Pernambuco, Brazil. Jul 17, 2024.*
12. PBE-Based Selective Abstraction and Refinement for Efficient Property Falsification of Embedded Software. Published Paper session. 7th STAAR Workshop. *Gyeongju, Korea. Jul 9, 2024.*
13. 능동 학습 기반 SW 재난 모델 자동생성. Lightning talk. 6th STAAR Workshop. *KAIST, Daejeon, Korea. Jan 30, 2024.*
14. 효율적인 검증 속성 위반 탐지를 위한 PBE 기반 함수요약 및 정제 기법. Lightning talk. 5th STAAR Workshop. *Ulsan, Korea. Jul 5, 2023.*
15. An Approach of Incremental Constraint Extraction Based on I/O Examples for Automatic Stub Generation. Research paper presentation. KCSE'23. *Pyeongchang, Korea. Feb 10, 2023.*
16. PBE 기반 스텁 자동생성 및 스텁코드 분할을 통한 모델검증 효율 향상. Lightning talk. 4th STAAR Workshop. *Paju, Korea. Feb 1, 2023.*
17. 프로그램 합성 기법을 이용한 모델체킹 검증 효율 향상 및 반례 트레이스 기반 알람 필터링 기법 연구. Lightning talk. 3rd STAAR Workshop. *Pohang, Korea. Jul 14, 2022.*
18. A Case Study to Improve the Efficiency of Model Checking in Embedded Software Using Program Synthesis. Research paper presentation. KSC'21. *Pyeongchang, Korea. Dec 21, 2021.*
19. A Case Study on the Performance of Program Synthesis in Embedded Software Domain. Research paper presentation. KCSE'21. *Online. Feb 2, 2021.*

Teaching Experience

Teaching Assistant, Kyungpook National University *Mar 2021 – Jun 2024*

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

Undergraduate Tutor, Kyungpook National University *Mar 2018 – Dec 2020*

- COMP0322: Database Management Systems (Fall 2020).
- CLTR266: Software Computational Thinking (Spring 2018, 2019).
- CLTR268: Python Programming (Winter 2018).
- COMP0216: Data Structure Applications (Fall 2018).

Research and Industry Experience

Undergraduate Research Intern, Software Safety Engineering Lab *Jul 2019 – Dec 2019; Sep 2020 – Feb 2021*

- Supervisor: Yunja Choi
- Developed a Java-based GUI tool to support software testing activities for Hyundai Motor.

Intern, JS System, Daegu *Dec 2019 – Feb 2020*

- Assisted with testing an FPGA-based embedded board.

Undergraduate Research Intern, AI-Based Networks Lab *Oct 2018 – Dec 2018*

- Supervisor: Dongkyun Kim