

# Curriculum Vitae

## Sunbeom So (소순범)

- Assistant Professor at GIST (Gwangju Institute of Science and Technology)
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## Research Interests

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I am interested in various research topics for improving the security and safety of software. To tackle my research problems, I mainly focus on developing and using techniques based on ***SMT-based formal methods*** such as formal verification and symbolic execution, but I am also interested in using other practical techniques such as fuzzing to effectively achieve the goal of my research.

- **Formal verification** for proving the absence of vulnerabilities and errors in software.
- **Symbolic execution** for finding vulnerabilities and errors in software.
- **Testing SMT solvers** for enhancing the reliability of verification and symbolic execution tools.
- **Efficient decision procedures for first-order theories** for making formal verification and symbolic execution more practical.

## Education

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- **Ph.D. in Computer Science and Engineering** 2016.09 – 2022.08  
Korea University Seoul, Korea  
Thesis: Automatic Verification, Testing, and Repair of Smart Contracts  
Advisor: Hakjoo Oh
- **B.S. in Computer and Communication Engineering** 2011.03 – 2016.08  
Korea University Seoul, Korea  
*Graduation with Top Honors (Valedictorian)*

## Work Experience

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- Assistant Professor 2023.09 – current  
School of Electrical Engineering and Computer Science Gwangju, Korea  
GIST
- Research Professor 2022.09 – 2023.08  
BK21 FOUR R&E Center for Computer Science and Engineering Seoul, Korea  
Korea University

## Publications

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I have published papers at top-tier conferences in the field of software security (**Security 2021**, **S&P 2020**), software engineering (**ICSE 2023**, **FSE 2023**), programming languages (**OOPSLA 2018**), and artificial intelligence (**IJCAI 2018**).

1. SMARTFIX: Fixing Vulnerable Smart Contracts by Accelerating Generate-and-Verify Repair using Statistical Models  
Sunbeom So, and Hakjoo Oh  
**ESEC/FSE 2023**: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*  
★ **BK21 인정 IF 4**
2. DIVER: Oracle-Guided SMT Solver Testing with Unrestricted Random Mutations  
Jongwook Kim\*, Sunbeom So\*, and Hakjoo Oh (\*: co-first authors)  
**ICSE 2023**: *45th International Conference on Software Engineering*  
★ **BK21 인정 IF 4**
3. SMARTTEST: Effectively Hunting Vulnerable Transaction Sequences in Smart Contracts through Language Model-Guided Symbolic Execution  
Sunbeom So, Seongjoon Hong, and Hakjoo Oh  
**Security 2021**: *30th USENIX Security Symposium*  
★ **BK21 인정 IF 3**
4. VERISMAST: A Highly Precise Safety Verifier for Ethereum Smart Contracts  
Sunbeom So, Myungho Lee, Jisu Park, Heejo Lee, and Hakjoo Oh  
**S&P 2020**: *41st IEEE Symposium on Security and Privacy*  
★ **BK21 인정 IF 4**
5. Automatic Diagnosis and Correction of Logical Errors for Functional Programming Assignments  
Junho Lee, Dowon Song, Sunbeom So, and Hakjoo Oh  
**OOPSLA 2018**: *ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications*  
★ **BK21 인정 IF 4**
6. Synthesizing Pattern Programs from Examples  
Sunbeom So, and Hakjoo Oh  
**IJCAI 2018**: *International Joint Conference on Artificial Intelligence*  
★ **BK21 인정 IF 4**
7. Synthesizing Imperative Programs from Examples Guided by Static Analysis  
Sunbeom So, and Hakjoo Oh  
**SAS 2017**: *Static Analysis Symposium*  
★ **BK21 인정 IF 1**
8. Synthesizing Regular Expressions from Examples for Introductory Automata Assignments  
Mina Lee\*, Sunbeom So\*, and Hakjoo Oh (\*: co-first authors)  
**GPCE 2016**: *ACM SIGPLAN International Conference on Generative Programming: Concepts and Experiences*  
★ **Best Paper Award**

## Academic Activities

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- Program Committee (PC) member

- **ISSTA 2025:** The ACM SIGSOFT International Symposium on Software Testing and Analysis  
★ BK21 인정 IF 2 학술대회
- Journal Reviewer
  - **TSE:** IEEE Transactions on Software Engineering (2022, 2023)  
★ JCR 2023 Q1 (9/131 in Software Engineering)
  - **TOSEM:** ACM Transactions on Software Engineering and Methodology (2023, 2024)  
★ JCR 2023 Q1 (8/131 in Software Engineering)
- Artifact Evaluation Committee (AEC) member
  - **CAV 2023:** 35th International Conference on Computer Aided Verification  
★ BK21 인정 IF 4 학술대회
  - **OOPSLA 2020:** ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications  
★ BK21 인정 IF 4 학술대회

## Open-sourced Research Software

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I have developed the following open-sourced software.

- **Main developer** of VERISmart, SMARTest, and SMARTfix  
VERISmart: a formal safety verification tool for smart contracts  
SMARTest: a symbolic execution tool for smart contracts  
SMARTfix: a vulnerability-repair tool for smart contracts  
<https://github.com/kupl/VeriSmart-public>
- **Main developer** of PAT  
A pattern program synthesizer  
<https://github.com/kupl/pat>
- **Main developer** of SIMPL  
An imperative program synthesizer  
<https://github.com/kupl/SimplPublic>
- Developer of ALPHAREGEX  
A regular expression synthesizer  
<https://github.com/kupl/AlphaRegexPublic>

## Research Grant (Principal Investigator)

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|---|-------------------|
| <ul style="list-style-type: none"> <li>• <b>Research Subsidies for Ph.D. Candidates</b><br/>National Research Foundation of Korea (NRF)<br/>20,000,000 KRW</li> </ul> | 2020.06 – 2021.05 |
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## Technology Transfer

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| <ul style="list-style-type: none"> <li>• <b>스마트 컨트랙트 검증 장치 및 방법</b> (오학주, <u>소순범</u>, 이명호)<br/>SOOHO.IO Inc.<br/>5,000,000 KRW</li> </ul> | 2020.09 – 2023.08 |
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## Awards

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- **The 27th Humantech Paper Award\* (Participation Prize)** 2021.02  
Samsung Electronics  
\*: # of awarded submissions: 116 out of 1991 (5.8%)
- **Naver Ph.D Fellowship Award** 2020.12  
Naver
- **Valedictorian at the College of Information & Communication** 2017.02  
Korea University
- **Best Paper Award** 2016.10  
ACM SIGPLAN GPCE 2016

## Scholarships

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- **Junior Fellow-Research Grant** 2020 Fall – 2021 Spring  
Korea University
- **Honor Graduates Scholarship** 2017 Spring – 2020 Spring  
Korea University
- **Undergraduate Student Scholarship** 2015 Spring – 2016 Spring  
Kwanjeong Educational Foundation
- **Academic Excellence Scholarship** 2012 Spring, 2014 Fall  
Korea University

## Invited Talks

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- Automatic Safety Analysis of Smart Contracts  
CSE Graduate Seminar at UNIST 2024.05.22
- Introduction to Program Analysis Techniques with Applications to Smart Contract Security  
Graduate Seminar at KENTECH 2024.05.01
- 스마트 컨트랙트 안전성 향상을 위한 프로그램 분석 기술 소개  
CS Colloquium at Korea University 2023.12.20
- SMARTTEST: Effectively Hunting Vulnerable Transaction Sequences in Smart Contracts through  
Language Model-Guided Symbolic Execution  
Top Conference Session at Korea Software Congress (KSC) 2021 2021.12.22
- VERISMART: A Highly Precise Safety Verifier for Ethereum Smart Contracts  
Top Conference Session at Korea Computer Congress (KCC) 2020, Online 2020.07.03

## Conference Presentations

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- SMARTFIX: Fixing Vulnerable Smart Contracts by Accelerating Generate-and-Verify Repair  
using Statistical Models  
**ESEC/FSE 2023**, San Francisco (USA) 2023.12.05
- SMARTTEST: Effectively Hunting Vulnerable Transaction Sequences in Smart Contracts through  
Language Model-Guided Symbolic Execution  
**USENIX Security 2021**, Online 2021.08.11

- VERISmart: A Highly Precise Safety Verifier for Ethereum Smart Contracts  
**IEEE S&P 2020**, Online 2020.05.20
- Synthesizing Pattern Programs from Examples  
**IJCAI 2018**, Stockholm (Sweden) 2018.07.16
- Synthesizing Imperative Programs from Examples Guided by Static Analysis  
**SAS 2017**, New York (USA) 2017.08.30
- Synthesizing Regular Expressions from Examples for Introductory Automata Assignments  
**GPCE 2016**, Amsterdam (Netherlands) 2016.10.31

## Teaching

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- *Programming Languages and Compilers* (taught in English) 2023 Fall, 2024 Fall  
Undergraduate course at GIST EECS
  - *Software Engineering* (taught in English) 2024 Spring  
Undergraduate course at GIST EECS