

# Hakjoo Oh

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## Research Areas

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I work on programming languages, software engineering, and software security.

- ▶ static and dynamic program analysis
- ▶ program synthesis and repair

## Education

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Ph.D. in Computer Science. Seoul National University	Mar 2007 – Feb 2012
M.S. in Computer Science. Seoul National University	Mar 2005 – Feb 2007
B.S. in Computer Science. KAIST	Mar 2001 – Feb 2005
Seoul Science High School	Mar 1999 – Feb 2001

## Experience

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Associate Professor, Korea University	Sep 2018 – Current
Assistant Professor, Korea University	Mar 2015 – Aug 2018
Research Assistant Professor, Seoul National University	Mar 2012 – Feb 2015

## Publications

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Published papers on programming languages, software engineering, security, and artificial intelligence in premier conferences and journals such as PLDI, OOPSLA, ICSE, FSE, ASE, S&P, IJCAI, and TOPLAS.

1. Sooyoung Cha, Seonho Lee, and Hakjoo Oh. *Template-Guided Concolic Testing via Online Learning*. **ASE 2018**: IEEE/ACM International Conference on Automated Software Engineering. September 2018
2. Sooyoung Cha, Sehun Jeong, and Hakjoo Oh. *A Scalable Learning Algorithm for Data-Driven Program Analysis*. **IST**: Information and Software Technology
3. Minseok Jeon, Sehun Jeong, and Hakjoo Oh. *Precise and Scalable Points-to Analysis via Data-Driven Context Tunneling*. **OOPSLA 2018**: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications. November 2018

4. Junho Lee, Dowon Song, Sunbeom So, and Hakjoo Oh. *Automatic Diagnosis and Correction of Logical Errors for Functional Programming Assignments*. **OOPSLA 2018**: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications. November 2018
5. Junhee Lee, Seongjoon Hong, and Hakjoo Oh. *MemFix: Static Analysis-Based Repair of Memory Deallocation Errors for C*. **FSE 2018**: ACM SIGSOFT Symposium on the Foundations of Software Engineering. November 2018
6. Sunbeom So and Hakjoo Oh. *Synthesizing Pattern Programs from Examples*. **IJCAI 2018**: International Joint Conference on Artificial Intelligence. June 2018
7. Sooyoung Cha, Seongjoon Hong, Junhee Lee, and Hakjoo Oh. *Automatically Generating Search Heuristics for Concolic Testing*. **ICSE 2018**: International Conference on Software Engineering. May 2018
8. Kihong Heo, Hakjoo Oh, Hongseok Yang, Kwangkeun Yi. *Adapting Static Analysis via Learning with Bayesian Optimization*. **TOPLAS**: ACM Transactions on Programming Languages and Systems. 2018 (to appear)
9. Kihong Heo, Hakjoo Oh, and Hongseok Yang  
*Learning Analysis Strategies for Octagon and Context Sensitivity from Labeled Data Generated by Static Analyses*. **FMSD**: Formal Methods in System Design. 2018 (to appear)
10. Woosuk Lee, Wonchan Lee, Dongok Kang, Kihong Heo, Hakjoo Oh, Kwangkeun Yi . *Sound Non-Statistical Clustering of Static Analysis Alarms*. **TOPLAS**: ACM Transactions on Programming Languages and Systems. 2017
11. Sehun Jeong, Minseok Jeon, Sungdeok Cha, and Hakjoo Oh. *Data-Driven Context-Sensitivity for Points-to Analysis*. **OOPSLA 2017**: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications, October 2017.
12. Kwonsoo Chae, Hakjoo Oh, Kihong Heo, Hongseok Yang . *Automatically Generating Features for Learning Program Analysis Heuristics for C-like Languages*. **OOPSLA 2017**: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications, October 2017.
13. Sunbeom So and Hakjoo Oh. *Synthesizing Imperative Programs from Examples Guided by Static Analysis*. **SAS 2017**: Static Analysis Symposium. 2017
14. Min-je Choi, Sehun Jeong, Hakjoo Oh, and Jaegul Choo. *End-to-End Prediction of Buffer Overruns from Raw Source Code via Neural Memory Networks*. **IJCAI 2017**: International Joint Conference on Artificial Intelligence. August 2017.
15. Seulbae Kim, Seunghoon Woo, Heejo Lee, and Hakjoo Oh. *VUDDY: A Scalable Approach for Vulnerable Code Clone Discovery*. **S&P 2017**: IEEE Symposium on Security and Privacy. May 2017.
16. Kihong Heo, Hakjoo Oh, and Kwangkeun Yi. *Machine-Learning-Guided Selectively Unsound Static Analysis*. **ICSE 2017**: International Conference on Software Engineering, May 2017
17. Kihong Heo, Hakjoo Oh, and Kwangkeun Yi. *Selective Conjunction of Context-Sensitivity and Octagon Domain toward Scalable and Precise Global Static Analysis*. **SP&E**: Software: Practice and Experience . 2017

18. Hakjoo Oh, Wonchan Lee, Kihong Heo, Hongseok Yang, and Kwangkeun Yi. *Selective X-Sensitive Analysis Guided by Impact Pre-Analysis*. **TOPLAS**: ACM Transactions on Programming Languages and Systems, vol. 38, Issue 2, 2016
19. Kihong Heo, Hakjoo Oh, and Hongseok Yang. *Learning a Variable-Clustering Strategy for Octagon from Labeled Data Generated by a Static Analysis*. **SAS 2016**: Static Analysis Symposium, 2016
20. Mina Lee, Sunbeom So, and Hakjoo Oh. *Synthesizing Regular Expressions from Examples for Introductory Automata Assignments*. **GPCE 2016**: ACM SIGPLAN International Conference on Generative Programming: Concepts and Experiences, 2016 (**Best Paper Award**)
21. Sooyoung Cha, Sehun Jeong, and Hakjoo Oh. *Learning a Strategy for Choosing Widening Thresholds from a Large Codebase*. **APLAS 2016**: Asian Symposium on Programming Languages and Systems, 2016
22. Sol Kim, Kihong Heo, Hakjoo Oh, and Kwangkeun Yi. *Widening with Thresholds via Binary Search*. **SP&E**: Software: Practice and Experience 2016
23. Hongzhe Li, Jaesang Oh, Hakjoo Oh, Heejo Lee. Automated Source Code Instrumentation for Verifying Potential Vulnerabilities. **IFIP SEC**: 31st International Information Security and Privacy Conference, 2016
24. Hakjoo Oh, Hongseok Yang, and Kwangkeun Yi. *Learning a Strategy for Adapting a Program Analysis via Bayesian Optimisation*. **OOPSLA 2015**: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications, October 2015.
25. Hakjoo Oh, Wonchan Lee, Kihong Heo, Hongseok Yang, and Kwangkeun Yi. *Selective Context-Sensitivity Guided by Impact Pre-Analysis*. **PLDI 2014**: The 35th ACM SIGPLAN Conference on Programming Language Design and Implementation, June 2014.
26. Hakjoo Oh, Kihong Heo, Wonchan Lee, Woosuk Lee, Daejun Park, Jeehoon Kang, and Kwangkeun Yi. *Global Sparse Analysis Framework*. **TOPLAS**: ACM Transactions on Programming Languages and Systems, vol. 36, Issue 3, 2014
27. Woosuk Lee, Hakjoo Oh, and Kwangkeun Yi. *A Progress Bar for Static Analyzers*. **SAS 2014**: Static Analysis Symposium, 2014
28. Yoonseok Ko, Kihong Heo, and Hakjoo Oh. *A Sparse Evaluation Technique for Detailed Semantic Analyses*, **COMLAN**: Computer Languages, Systems, and Structures, Vol. 40, Issues 3-4, 2014
29. Hakjoo Oh, and Kwangkeun Yi. *Access-based Abstract Memory Localization in Static Analysis*. **SCP**: Science of Computer Programming 78(9):1701-1727, 2013
30. Hakjoo Oh, Kihong Heo, Wonchan Lee, Woosuk Lee, and Kwangkeun Yi. *Design and Implementation of Sparse Global Analyses for C-like Languages*. **PLDI 2012**: The 33rd ACM SIGPLAN Conference on Programming Language Design and Implementation, June 2012 (**First PLDI paper from Korea**)
31. Hakjoo Oh, Lucas Brutschy, and Kwangkeun Yi. *Access-analysis-based Tight Localization of Abstract Memories*. **VMCAI 2011**: International Conference on Verification, Model Checking, and Abstract Interpretation, Jan 2011
32. Hakjoo Oh, and Kwangkeun Yi. *Access-based Localization with Bypassing*. **APLAS 2011**: Asian Symposium on Programming Languages and Systems, December 2011

33. Hakjoo Oh, and Kwangkeun Yi. *An Algorithmic Mitigation of Large Spurious Interprocedural Cycles in Static Analysis*. **SP&E: Software: Practice and Experience** 40(8):585-603, 2010
34. Hakjoo Oh. *Large Spurious Cycles in Global Static Analysis and Its Algorithmic Mitigation*. **APLAS 2009: Asian Symposium on Programming Languages and Systems**, December 2009
35. Yungbum Jung, Hakjoo Oh, and Kwangkeun Yi. *Identifying Static Analysis Techniques for Finding Non-fix Hunks in Fix Revisions*. **DSMM 2009: ACM Workshop on Data-intensive Software Management and Mining**, November 2009

## Selected Talks

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1. Introduction to Software Research at Korea University. S-Core. June. 11, 2018.
2. Data-Driven Program Analysis. KAIST. Oct 30, 2017.
3. Data-Driven Program Analysis. SNU. Sep 29, 2017.
4. Data-Driven Static Analysis. NII Shonan Meeting on Memory Abstractions: Emerging Techniques and Applications. Sep 12, 2017.
5. Automatically Generating Search Heuristics for Concolic Testing. SW Center, Samsung Electronics. Aug. 8, 2017.
6. Data-Driven Program Analysis. Postech CSE Seminars. Nov. 9, 2016.
7. Machine-Learning-Guided Adaptive Program Analysis. The Seventh Workshop on Tools for Automatic Program Analysis (TAPAS 2016), Edinburgh, UK. September 7, 2016.
8. Machine-Learning-Guided Adaptive Program Analysis. SIGPL Summer School. Aug. 19, 2016.
9. Learning a Strategy for Adapting a Program Analysis via Bayesian Optimization. Paper presentation at *ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2015)*, Pittsburgh, USA. October 29 2015.
10. Selective Context-Sensitivity Guided by Impact Pre-Analysis. Paper presentation at *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2014)*, Edinburgh, Scotland. June 11 2014.
11. Selective-X Analysis Guided by Impact Pre-Analysis. *Workshop on Analysis and Verification of Cyber Physical Software*, Seoul, Korea. Dec 23 2013.
12. Sparse Analysis Framework. Dagstuhl Seminar 13162 on Pointer Analysis, Dagstuhl, Germany. Apr 18 2013.
13. Spatial and Temporal Localization Techniques for Global Static Analysis. *Workshop on Analysis and Verification of Cyber Physical Software*, Changsha, China. Oct 25 2012.
14. Design and Implementation of Sparse Global Analyses for C-like Languages. Paper presentation at *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2012)*, Beijing, China. June 12 2012.

15. Static Program Analysis for Million Lines of Code  
Tutorial at Korea Computer Congress, Jeju, Korea. June 28 2012.
16. Cost-reduction Techniques for Static Program Analysis  
SIGPL Winter School, Gyeongbuk, Korea. February 03-04 2012.
17. Access-analysis-based Tight Localization of Abstract Memories  
Paper presentation at *The Twelves International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2011)*. Austin, Texas, USA. January 23 2011.
18. Access-based Localization with Bypassing  
Paper presentation at *The Ninth Asian Symposium on Programming Languages and Systems (APLAS 2011)*. Kenting, Taiwan. December 05 2011.
19. Global Static Analysis of Million Lines of Code  
Lightning talk at *ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2012)*, Philadelphia, USA. Jan 25 2012.
20. Large Spurious Cycles in Global Static Analysis and Its Algorithmic Mitigation  
Paper presentation at *The Seventh Asian Symposium on Programming Languages and Systems (APLAS 2009)*. Seoul, Korea. December 14 2009.
21. Avoiding Spurious Cycles Matters for Scalable Analysis  
Poster presentation at *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2008)*. Poster Session. Tucson, Arizona, USA. June 8, 2008

## Academic Activities

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### Program Committee (PC) members

- ▶ CAV 2019: 31st International Conference on Computer-Aided Verification
- ▶ ATVA 2019: 17th International Symposium on Automated Technology for Verification and Analysis
- ▶ APLAS 2018: 16th Asian Symposium on Programming Languages and Systems
- ▶ SAS 2018: 25th Static Analysis Symposium
- ▶ OOPSLA 2018: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
- ▶ APLAS 2017: 13th Asian Symposium on Programming Languages and Systems
- ▶ APLAS 2015: 13th Asian Symposium on Programming Languages and Systems
- ▶ SAC 2015: 30th ACM Symposium on Applied Computing (Programming Languages Track)
- ▶ SAC 2014: 29th ACM Symposium on Applied Computing (Programming Languages Track)
- ▶ APLAS 2013: 11th Asian Symposium on Programming Languages and Systems

### Invited participant

- ▶ NII Shonan Meeting on Memory Abstraction, Emerging Techniques and Applications, September 10-14, 2017.

- ▶ Dagstuhl Seminar 13162 on Pointer Analysis, April 2013 (<http://www.dagstuhl.de/13162>)

## Software

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I have contributed as a main developer to the following software projects:

- ▶ Sparrow: an industrial-strength static analyzer for detecting memory bugs in C programs
  - Academic version: <https://github.com/ropas/sparrow>
  - Commercialized version: <http://sparrowfasoo.com/product/sast>