

Soonho Kong

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Research Interests

I am interested in safety and reliability of software, which span the spectrum from programming languages, through program analysis and verification, to software engineering.

Current Position

ROSAEC Center, Seoul National University Sep 2009 – Present
Research Associate
Director: Prof. Kwangkeun Yi

Education

Seoul National University Mar 2007 – Aug 2009
Master of Science in Computer Science and Engineering
Thesis: Abstract Parsing for Two-staged Languages with Concatenation
Advisor: Prof. Kwangkeun Yi

Seoul National University Mar 2000 – Feb 2007
Bachelor of Science in Computer Science and Engineering
graduated with honors (*Cum laude*)

Current Research Projects

ROSAEC Center, Seoul National University Sep 2009 – Present
Research Associate Director: Prof. Kwangkeun Yi

- ▶ **Quantified Invariants Generation via Algorithmic Learning** (*work in progress*)
Using restricted templates, we are extending the previous invariant generation technique [2] to find quantified invariants. I am participating in the design and implementation of this extension. This is a joint work with Yungbum Jung (SNU), Cristina David (National Univ. of Singapore), Prof. Bow-Yaw Wang (Academia Sinica), and Prof. Kwangkeun Yi (SNU). Submitted to CAV'10.
- ▶ **Semantic Analysis of Multi-staged Programs with Abstract Parsing** (*work in progress*)
By augmenting parse states with semantic objects in the domain of the previous abstract parsing work [3], I am extending abstract parsing to allow semantic analysis of generated programs as well as syntactic analysis. This is a joint work with Wontae Choi (SNU) and Prof. Kwangkeun Yi (SNU).

- ▶ **Subclassability Analysis for Java** *(work in progress)*
In the Apache bug reports, we found more than two thousand bug reports complaining that the base class is not well-designed and consequently cannot be inherited. I am participating in the design and implementation of subclassability analysis for Java to check whether the given class can be safely inherited. This is a joint work with Prof. Bruno Oliveira (SNU), Dr. Tom Schrijvers (Catholic Univ. of Leuven), and Prof. Kwangkeun Yi (SNU).

Past Research Projects and Experience

Seoul National University Mar 2007 – Aug 2009
M.S. Student in Programming Research Laboratory Advisor: Prof. Kwangkeun Yi

- ▶ **Invariant Generation using Algorithmic Learning**
Collaborated to the design, implementation, and experimentation of automated invariant generation technique which combines algorithmic learning, decision procedures, and predicate abstraction [2].
- ▶ **Syntax Check for Two-staged Programming Languages**
Formulated and parameterized abstract parsing, a static analysis technique for checking the syntax of generated strings, in the abstract interpretation framework. Applied to two-staged programming languages [3] and the PCC framework for program-generators [4].
- ▶ **Industrialized Static Analyzer for C/C++**
Participated in the development and industrialization of Sparrow (<http://spa-arrow.com>), a semantic-based static analyzer pointing to memory errors in C/C++ source [6].

Microsoft Research, Redmond Aug 2008 – Nov 2008
Research Intern in Foundation of Software Engineering Group Mentor: Nikolai Tillmann

- ▶ **Automatic Testcase Generation**
Designed and implemented parameterized models [5] for the file system and LINQ(Language INtegrated Query for .NET) to enable Pex, a dynamic symbolic execution tool for .NET, to generate testcases for a given program using its environment.

Microsoft Research, Asia Aug 2007 – Feb 2008
Research Intern in Theory Group Mentor: Ting Zhang

- ▶ **QBF (Quantified Boolean Formulae) Solver**
Designed and implemented CMS (Cost Minimizing Search) solver. Submitted to the QBFEVAL 2008 and ranked 3rd place in non-prenex non-CNF track.

Publications

- [1] Cristina David, Yungbum Jung, **Soonho Kong**, Bow-Yaw Wang, and Kwangkeun Yi. Inferring Quantified Invariants via Algorithmic Learning, Decision Procedures, and Predicate Abstraction. *ROSAEC Center Technical Memorandum* ROSAEC-2010-007, January 2010.
<http://rosaec.snu.ac.kr/publish/2010/techmemo/ROSAEC-2010-007.pdf>
- [2] Yungbum Jung, **Soonho Kong**, Bow-Yaw Wang, and Kwangkeun Yi. Deriving invariants in propositional logic by algorithmic learning, decision procedures, and predicate abstraction. In *Proceedings of International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI 2010)*. Springer, 2010.
<http://ropas.snu.ac.kr/~soon/paper/vmcai10.pdf>

- [3] **Soonho Kong**, Wontae Choi, and Kwangkeun Yi. Abstract parsing for two-staged languages with concatenation. In *Proceedings of the International Conference on Generative Programming and Component Engineering (GPCE 2009)*. ACM, 2009.
<http://ropas.snu.ac.kr/~soon/paper/gpce09.pdf>
- [4] **Soonho Kong**, Wontae Choi, and Kwangkeun Yi. PCC framework for program generators. In *Proceedings of the Workshop on Proof-Carrying Code and Software Certification (PCC 2009)*, NASA, 2009.
<http://ropas.snu.ac.kr/~soon/paper/pcc09.pdf>
- [5] **Soonho Kong**, Nikolai Tillmann, and Jonathan de Halleux. Automated testing of environment-dependent programs - a case study of modeling the file system for Pex. *Third International Conference on Information Technology: New Generations (ITNG 2009)*, 1:758–762, IEEE, 2009.
<http://ropas.snu.ac.kr/~soon/paper/itng09.pdf>
- [6] Hakjoo Oh, Yungbum Jung, Minsik Jin, Deokhwan Kim, Yikwon Hwang, Daejun Park, Hee-jong Lee, **Soonho Kong**, and Kwangkeun Yi. Sparrow: The source code analyzer. *KIISE(Korean Institute of Information Scientists and Engineers) Conference 2007*, 34(IC):500–504, KIISE, 2007.
<http://ropas.snu.ac.kr/~soon/paper/kcc07.pdf>

Presentations

- 1. “Deriving invariants in propositional logic by algorithmic learning, decision procedures, and predicate abstraction.” *The 11th International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI 2010)*. Madrid, Spain. January 18 2010.
<http://ropas.snu.ac.kr/~soon/talk/20100118.pdf>
- 2. “Deriving invariants in propositional logic by algorithmic learning, decision procedures, and predicate abstraction.” *The 7th Asian Symposium on Programming Languages and Systems (APLAS 2009)*. Poster Session. Seoul, Korea. December 14 2009.
<http://ropas.snu.ac.kr/~soon/talk/20091214.pdf>
- 3. “PCC Framework for Program Generators.” *The 3rd International Workshop on Proof-Carrying Code and Software Certification*. Los Angeles, CA. August 15 2009.
<http://ropas.snu.ac.kr/~soon/talk/20090815.pdf>
- 4. “Abstract Parsing for Two-staged Languages with Concatenation” *The 2nd ROSAEC(Research on Software Analysis for Error-free Computing) Center Workshop*. Paju, Korea. July 10 2009.
<http://ropas.snu.ac.kr/~soon/talk/20090710.pdf>

Honors & Awards

National Graduate Science & Technology Scholarship Korea Student Aid Foundation(KOSAF)	Sep 2008 – Aug 2009 \$7,000
Brain Korea 21 Global Internship (MSR) Korea Research Foundation	Aug 2008 – Nov 2008 \$5,500
Brain Korea 21 Scholarship School of Computer Science and Engineering, Seoul National University	Mar 2008 – Aug 2008 \$2,600

Brain Korea 21 Global Internship (MSRA) Aug 2007 – Feb 2008
Korea Research Foundation \$7,400

Brain Korea 21 Scholarship Mar 2007 – Aug 2007
School of Computer Science and Engineering, Seoul National University \$2,600

Teaching Experience

Teaching Assistant – “Program Analysis” Spring 2009
Implemented supporting files for assignments, graded assignments, and provided consultations for students. (graduate course 4541.664A, lecturer: Prof. Kwangkeun Yi)

Teaching Assistant – “Principles of Programming” Fall 2008
Helped with course project. (undergraduate course 4190.210, lecturer: Prof. Kwangkeun Yi)

Teaching Assistant – “Principles of Programming” Spring 2007
Taught weekly lab sessions, graded assignments, provided consultations for students, and helped with course project. (undergraduate course 4190.210, lecturer: Prof. Kwangkeun Yi)

Professional Activities

External Reviewer

- ▶ International Conference on Computer Aided Verification (CAV 2010)
- ▶ International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2010)
- ▶ International Static Analysis Symposium (SAS 2009)
- ▶ International Workshop on Defects in Large Software Systems (DEFECTS 2009)
- ▶ Asian Symposium on Programming Languages and Systems (APLAS 2007)

Working Experience

8th U.S. Army Apr 2003 – Apr 2005
Information center, 201st signal company, Yongsan garrison, Seoul, Korea
During the two-year mandatory military service, I developed and maintained the software system for the information center and assisted lecturers in the Microsoft Certified Technical Education Center located in the garrison.

English Proficiency

iBT TOEFL 15 Nov 2008
Total Score : 110
Reading(30), Listening(30), Speaking(23), Writing(27)

GRE 22 Oct 2005
Verbal(570/77%), Quantitative(800/92%), Analytical Writing(4.0/31%)

Extracurricular Activities

TED Open Translation Project

Aug 2009 – Present

Participated in the TED open translation project as an English-Korean translator and reviewer. My translations are available at <http://www.ted.com/profiles/translations/id/291871>.

References

Kwangkeun Yi

Professor

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Sung Kim

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Bow-Yaw Wang

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Nikolai Tillmann

Principal RSDE

Foundations of Software Engineering Group
Microsoft Research, Redmond

Email: nikolait@microsoft.com

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<http://ropas.snu.ac.kr/~soon/cv.pdf>