

## Ilchul Yoon

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### CONTACT INFORMATION

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### RESEARCH INTERESTS

Software Engineering (Software Compatibility Testing, Software Process)  
Distributed High-Performance Computing

### EDUCATION

**University of Maryland**, College Park, Maryland USA

Ph.D. in Computer Science

- December, 2010
- Advisor: Dr. Alan Sussman
- Dissertation Title: "Compatibility Testing for Component-Based Systems"

**Korea Advanced Institute of Science and Technology (KAIST)**, Daejeon, Republic of Korea

M.S., Computer Science, August, 2001 (Advisor: Dr. Doo-Hwan Bae)

**Sogang University**, Seoul, Republic of Korea

B.E., Computer Science, February, 1999 (Magna Cum Laude)

### EXPERIENCE

**Robert H. Smith School of Business, University of Maryland**, College Park, Maryland USA

*Tyser Teaching Fellow*

*Aug. 2011 - Present*

*Currently teaching: Database Systems and Business Application Development*

**Department of Computer Science, University of Maryland**, College Park, Maryland USA

*Post-Doctoral Research Associate*

*January 2011 - May 2011*

- Investigating an effective solution to support community-driven software compatibility testing

**Department of Computer Science, University of Maryland**, College Park, Maryland USA

*Graduate Research Assistant*

*August 2004 - December 2010*

- Designed and implemented an effective framework that supports software compatibility testing, utilizing multiple resources (written in Perl)
- Designed and implemented a light-weight runtime environment that facilitates composing and executing coupled memory parallel components on the Grid (written in Perl)
- Developed an efficient framework for coupling distributed memory parallel components that enables efficient communication in the presence of complex data distributions (written in C - partly, in C++ and Fortran)

*Graduate Teaching Assistant*

*August 2002 - August 2004*

- Computer Science I (C++, Basic Algorithms) (CMSC 114) - Fall 2002
- Computer Systems Architecture (CMSC 411) - Spring/Fall 2003, Spring/Summer 2004

**Electronics and Telecommunications Research Institute (ETRI)**, Daejeon, Republic of Korea

*Software Researcher*

*September 2001 - July 2002*

- Designed and implemented a technique to support simultaneous round-trip engineering (SRE) between source code and UML model as a part of a component-based software development environment (writ-

ten in Java)

**Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea**

*Graduate Research/Teaching Assistant*

*March 1999 - August 2001*

- Developed a process-centered software engineering environment that provides multi-level process modeling and employs a high-level Petri net as an underlying formalism. (written in Java)
- Developed an automated environment to support tailoring software process and to validate the conformance of the tailored process to the organizational-level software process. (written in Java)

**Sogang University, Seoul, Republic of Korea**

*Student Software Engineer*

*Mar. 1998 - Feb. 1999*

- Participated in building Sogang Virtual University as a Web developer.

**HONORS AND  
AWARDS**

**Merit-based Travel Awards**

ACM SIGSOFT, Travel awards for attending the ISSTA conference, Jun. 2008

**Information and Telecommunication National Scholarship**

Institute of Information Technology, Republic of Korea, 2002 – 2005

**Merit-based Scholarship**

University of Maryland, College Park, 2002 – 2004

Sogang University, 1993 – 1994, 1996 – 1999

**Alpha Sigma Nu, National Jesuit Honor Society, 1998 - Present**

**PUBLICATIONS AND  
PRESENTATIONS**

**Publications**

1. Ilchul Yoon, Alan Sussman, Atif Memon, Adam Porter, "Towards Incremental Component Compatibility Testing", *International ACM SIGSOFT Symposium on Component Based Software Engineering (CBSE 2011)*, Jun., 2011.
2. Ilchul Yoon, "Compatibility Testing for Component-based Systems", Ph.D. Thesis, Dec., 2010.
3. Il-Chul Yoon, Alan Sussman, Atif Memon, Adam Porter, "Prioritizing Component Compatibility Tests via User Preferences", *International Conference on Software Maintenance (ICSM 2009)*, Sep., 2009.
4. Il-Chul Yoon, Alan Sussman, Atif Memon, Adam Porter, "Effective and Scalable Software Compatibility Testing", *International Symposium on Software Testing and Analysis (ISSTA 2008)*, Jul., 2008.
5. Il-Chul Yoon, Alan Sussman, Atif Memon, Adam Porter, "Direct-Dependency-based Software Compatibility Testing", *IEEE/ACM International Conference on Software Engineering (ASE 2007)*, Nov., 2007.
6. Il-Chul Yoon, Alan Sussman, Adam Porter, "And Away We Go: Understanding The Complexity of Launching Complex HPCA Applications", *International Workshop on Software Engineering for High Performance Computing System Applications (SE-HPCS'05)*, May, 2005.
7. Yangjae Jeong, Il-Chul Yoon, Minjeong Kim, Woojin Lee and Gysang Shin, "Development of the Tool Supporting Design Pattern and Maintaining Alteration of Design Model for EJB Component Design", *International Conference on Software Engineering Research and Practice (SERP'02)*, Jun., 2002.
8. Il-Chul Yoon, Sang-Yoon Min, Doo-Hwan Bae, "Tailoring and Verifying Software Process", *IEEE Asia-Pacific Software Engineering Conference (APSEC 2001)*, Dec., 2001.
9. Il-Chul Yoon, Hyung-Ho Kim, Cheong Yoon, Doo-Hwan Bae, "Reliable Transaction Design in MTS", *IEEE International Computer Software and Applications Conference (COMPSAC 2000)*, Oct., 2000.
10. Il-Chul Yoon, "Tailoring and verifying Software Process", MS Thesis, Aug. 2001.

### **Selected Talks**

1. “An Automated Framework to Test Software Compatibility”, at *International Conference on Software Testing, Verification, and Validation (Doctoral Symposium)*, Apr. 2009.
2. “Automating Software Compatibility Testing”, *International Symposium on Software Testing and Analysis (Doctoral Symposium)*, Jul. 2008.
3. “Automated Software Compatibility Testing”, *University of Maryland Software Day*, Jan. 2008.
4. “Direct-Dependency-based Software Compatibility Testing”, *SoftChat (Computer Science Department)*, Oct. 2007.

### **Other Publications**

1. Il-Chul Yoon, Alan Sussman, “The Ratchet v1.0 Developer’s Guide”, *Department of Computer Science, University of Maryland, College Park*. Nov. 2010.
2. Norman Lo, Il-Chul Yoon, Jae-Yong Lee, Christian Hansen, Henrique Andrade, Guy Edjlali, Alan Sussman, “A Manual for InterComm Version 1.6”, *Department of Computer Science, University of Maryland, College Park*. Jun. 2007.
3. Il-Chul Yoon, Norman Lo, Alan Sussman, “High-Performance Computing Application Launching Environment Manual Version 1.0”, *Department of Computer Science, University of Maryland, College Park*. Oct. 2006.

### **PROFESSIONAL ACTIVITIES**

#### **Technical Reviewer**

The ACM/IEEE Conference for High Performance Computing, Networking, Storage and Analysis (SC’11, SC’10, SC’08)

The International Conference on Grid Computing (Grid’10, Grid’09)

The 8th USENIX Conference on File and Storage Technologies (FAST’10)

The Annual IEEE International Conference on High Performance Computing (HiPC’10, HiPC’09, HiPC’06)

The International Symposium on High Performance Distributed Computing (HPDC’09)

The 8th IEEE International Symposium on Cluster Computing and the Grid (CCGrid’08)

The 2nd Workshop on Desktop Grids and Volunteer Computing Systems (PCGrid’08)

The 13th International Conference on Parallel and Distributed Systems (ICPADS’07)

The International Symposium on Parallel and Distributed Processing and Applications (ISPA’07, ISPA’06)

The 20th ACM International Conference on Supercomputing (ICS’06)

### **SELECTED RESEARCH PROJECTS**

#### **Automated Software Compatibility Testing**

Modern software systems are typically composed of multiple components, each with multiple versions and developed by multiple vendors. Testing the compatibility of multi-component based systems on top of diverse field environments (or configurations) is very important to improve the quality of a system, and also to rationally manage the maintenance effort for the system. This project aims at investigating methods and tools to create an automated testing framework that supports software compatibility testing. To achieve the goal, I developed a process, a modeling scheme, algorithms and infrastructure that are to perform large-scale compatibility testing for evolving component-based systems. The experimental and simulation results conducted for two large scientific systems show that developed approach can detect incompatibilities between components effectively with reduced test efforts.

#### **Automated Support for Launching High-Performance Computing Applications on Grid**

Launching High-Performance Computing (HPC) applications on Grid is a complex task and requires repetitive and error-prone work from developers. To launch a complex HPC application, developers first discover resources spread across machines on Grid, and then they need to allocate resources and also to handle input and output files. This project is to better understand the launching process and to provide a light-weight runtime environment to facilitate this process. I was responsible for developing the initial prototype of the system. To use the system, users specify high-level job descriptions in a simple XML format. The specification contains information on applications to launch and target resources for the applications. Based on the description, the runtime system automatically refine the descriptions to contain all detailed information to launch the applications on the resources. Then, the system co-allocates resources, launches the applications and captures all the results back to the users.

### **InterComm: A Framework for Coupling Distributed Memory Parallel Components on Grid**

Many applications in scientific domains are designed to run on various resource types and also in parallel. However, the applications may use different types of parallel libraries and languages. Therefore, the ability to couple such applications is required in many emerging domains, such as complex simulations that model physical phenomena at multiple scales and resolutions by seamlessly coupling applications for such simulations. InterComm is a framework to couple parallel components in the presence of complex data distributions within a coupled application by providing efficient serialization and transfer of data maintained by multiple processes instantiated for the components. I participated in this project to develop modules that support the interaction between applications written in different programming languages.

**TECHNICAL SKILLS** I am proficient with the following technologies.

#### Operating Systems

- Linux, Mac OS X, MS Windows, Solaris

#### Programming Language Skill:

- Experience in *Perl*: Approx. 89,000 lines for two research projects
- Experience in *C*: Approx. 25,000 lines for a research project (Partly, written in C++ and Fortran)
- Experience in *Java* for two research projects
- Experience in *C++* as part of teaching activity
- Experience in *Visual Basic* as part of teaching activity

#### Distributed Programming Environments:

- **MPI** and **PVM** programming
- Java RMI, SOAP, Globus, OGSA, WSRF, XML, CCA (Common Component Architecture)

#### Hardware Virtualization Techniques

- Guest VM management through VMware Server API for Ph.D. research

#### Database Systems

- Microsoft SQL Server, MySQL

### REFERENCES

#### **Dr. Alan Sussman**

Associate Professor  
Department of Computer Science  
A.V. Williams Building  
University of Maryland  
College Park, MD 20742 USA  
TEL: 301-405-3360  
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#### **Dr. Adam Porter**

Professor  
Department of Computer Science  
A.V. Williams Building  
University of Maryland  
College Park, MD 20742 USA  
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#### **Dr. Atif Memon**

Associate Professor  
Department of Computer Science  
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