

DONGHOON KIM

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EDUCATION

North Carolina State University

Ph.D., Computer Science, Aug 2016

Thesis: Securing Data Flows within Software Application Networks in Cloud Environments

Raleigh, NC, USA

Advisor: Dr. Mladen A. Vouk

Auburn University

M.S., Computer Science, Dec 2003

Thesis: A simple protocol for dominating set construction in mobile ad hoc networks

Auburn, AL, USA

Gangneung-Wonju National University

B.A., Computer Science, Aug 1999

Gangneung, Korea (Republic of)

RESEARCH PUBLICATIONS

1. **D. Kim** and M. A. Vouk, "A Model Toward Scientific Workflow Security in a Cloud", The 4th International IBM Cloud Academy Conference (ICA CON 2016); invited to a special issue of the International Journal of Web Services Research (IJWSR).
2. **D. Kim** and M. A. Vouk, "Assessing Run-time Overhead of Securing Kepler", The International Conference on Computational Science, ICCS 2016, Volume 80, 2016, Pages 1-6.
3. **D. Kim** and M. A. Vouk, "Securing Software Application Chains in a Cloud", The 2nd International Conference Information Science and Security (ICISS), IEEE, 2015.
4. **D. Kim** and M. A. Vouk, "Securing Scientific Workflows", Software Quality, Reliability and Security-Companion (QRS-C), 2015 IEEE International Conference on. IEEE, 2015, pp. 95-104.
5. **D. Kim**, H. E. Schaffer, and M. A. Vouk, "PaaS Security Countermeasures: A Survey", The 3rd International IBM Cloud Academy Conference (ICA CON 2015)
6. **D. Kim** and M. A. Vouk, "A survey of common security vulnerabilities and corresponding countermeasures for SaaS.", Globecom Workshops (CCSNA), 2014, pp. 59-63. IEEE, 2014
7. **D. Kim** and G. Yi, "Measuring Syntactic Sugar Usage in Programming Languages: An Empirical Study of C# and Java Projects", Advanced in Computer Science and its Applications Lecture Notes in Electrical Engineering Vol. 279, 2014, pp 279-284
8. **D. Kim**, E. Murphy-Hill, C. Parnin, C. Bird, and R. Garcia, "The Reaction of Open Source Projects to New Language Features: An Empirical Study of C# Generics", The Journal of Object Technology, vol. 12, no. 4, 2013, pages 1-26
9. **D. Kim**, "Measuring Syntactic Sugar Usage in Programming Languages: An Empirical Study of C# and Java Projects", Abstract version, The UKC (US-Korea Conference) 2013
10. K. Kharbas, **D. Kim**, T. Hoefler, and F. Mueller, "Assessing HPC Failure Detectors for MPI Jobs", The 20th Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP), pp. 81-88, IEEE, Munich, Germany, February 2012
11. K. Kharbas, **D. Kim**, K. KC, T. Hoefler, and F. Mueller, "Failure Detection within MPI Jobs: Periodic Outperforms Sporadic", TR 2011-13, Dept. of Computer Science, North Carolina State University, June 2011
12. **D. Kim**, Y. Cho, C. Kim, S. Kim, S. Park, and T. Kang, "E-ITRC protocol with Long & Adjustable range on Underwater Acoustic Sensor Network", The 3rd IEEE International Workshop on Heterogeneous Wireless Networks (held in conjunction with AINA-2007), Niagara Falls, Ontario, Canada, May 2007
13. **D. Kim**, Y. Cho, C. Kim, S. Kim, and T. Kang, "Energy efficiency & Innovative Time Reduction Communication protocol on Underwater Acoustic Sensor Network", Special Session on Wireless Sensor Networks in the 22nd International Conference on Computer and Applications (CATA-2007), Honolulu, Hawaii, USA, March 2007
14. **D. Kim**, B. Kim, and M. Sun, "Routing-Friendly Dominating Set Construction in Mobile Ad Hoc Networks", Proc. of Hawaii International Conference on Computer Science 2004
15. **D. Kim**, B. Kim, and M. Sun, "A Simple Protocol for Dominating Set Construction in Mobile Ad Hoc Networks", Proc. IEEE International Workshop on Applications of Ad Hoc Networks (held in conjunction with ICPP-2003), pp. 35-41, Kaohsiung, Taiwan, October 2003

1. **D. Kim** and M. A. Vouk, "About PaaS Security", submitted to the International Journal of Cloud Computing - ICA CON 2015: Special Issue on: A Collaborative Community of Leaders: Cloud Computing in Education, 2016 (an invited paper)

PROFESSIONAL EXPERIENCE

IBM, NC, USA **Software Engineer, Intern** **Sept 2015 - July 2016**
VCL (Virtual Computing Lab) cloud service on SoftLayer

- Analyze VCL security in the cloud environments
- Improve the performance of VCL service based on diversity virtual machines

SAS Institute, NC, USA **Software Engineer, Intern** **May 2012 - Aug 2012**
The analysis of monitoring and diagnostic software in cloud systems

- Analyzed existing cloud monitoring tools suitable for SAS 9.4 to support scalable and fault-tolerant cloud services (VMware vFabric Hyperic, Compuware dynaTrace, Amazon CloudWatch etc.)
- Measured the performance of critical system metrics for SAS cloud systems to guarantee end-to-end user response time in timely manner

Samsung Electronics, Korea **Software Engineer** **Feb 2004 - Mar 2006**
Software development for mobile phones at Mobile Communication Division

- Developed mobile phones S/W on Qualcomm MSM Chip for Verizon Wireless
- Designed and implemented user interface for audio applications in mobile phones
- Led, implemented, and delivered a Speakerphone module to Samsung SCH-970 mobile phone
- Ported and refactored feature phone games on Linux embedded system
- Developed mobile phone platforms for Verizon Wireless

RESEARCH & PROJECT EXPERIENCE

Securing Kepler projects

- Implemented the Security Analysis Package (SAP) to keep the security properties (data integrity, input validation, remote access validation) of Kepler applications in cloud environments by modifying provenance module
- Analyzed the performance of SAP and provenance module with micro benchmark

HPC (High-Performance Computing) projects

- Implemented a monitoring tool to detect MPI (Message Passing Interface) failure using **multi-threading technique** on parallel systems
- Analyzed the performance of the failure detector algorithms with NAS Parallel Benchmark

CPU scheduling

- Analyzed the performance of existing CPU scheduling algorithms suitable for multi-core processors on virtual machine environment (XEN)
- Designed and implemented a CPU scheduler with user-level priority using POSIX Thread Programming

Operating System projects

- Implemented a new system call into the existing Linux Kernel (V.2.6, V.3.5)
- Implemented a user level memory management class (first fit, best fit, worst fit)
- Developed file systems formatted with FAT file system

Wireless Network

- Analyzed the vulnerability of 802.11 MAC layer and implemented a bandwidth consumption attack by utilizing back-off time in Wireless Networks (OMNET++)
- Implemented an efficient broadcast authentication scheme on wireless embedded sensor networks (nesC)
- Implemented simulation codes of an efficient algorithm to construct a dominating set on wireless sensor networks (C++)

Android development

- Developed several android apps of various features, including basic app navigation and UI, locations awareness/searching/tracking, sensing, multimedia and social networking. Developed the apps using Java on Eclipse

Program Languages Analysis and Software Engineering

- Implemented a tool to extract the C# language features from source code management tools (SVN, CVS, Git)
- Implemented an automated system for analyzing the usage of language features in C#, Python, MySQL
- Enhanced the functionalities of an existing tool to extract additional Java language features
- Developed web applications on tomcat server and conducted testing with JUnit test and EclEmma

ACADEMIC EXPERIENCE

North Carolina State University, USA

Aug 2007 - Jul 2016

- (RA) Software Engineering and Cloud Computing Security
- (TA) Operating Systems, Software Engineering, Game Programming (XNA Game Studio, C#)

Gangneung-Wonju National University, Korea

Mar 2007 - Jul 2007

- (Instructor) Undergraduate Discrete Mathematics

Auburn University, USA

Jan 2002 - Dec 2003

- (TA) Object-Oriented Programming C++

PROFESSIONAL ACTIVITY

- Globecom Workshop 2015 (CCSNA), Program committee member
- ICC Workshop 2015 (CCSNA), Program committee member
- ESP-DGC 2015, Program committee member
- MSR 2012 Mining Challenge, Program committee member

INVITED TALKS

- Theory and Practice of Cloud Computing and Work in the IT industry, Gangneung-wonju National University, S. Korea on Dec 8, 2015
- Theory and Practice of Cloud Computing, Gwangju Institute of Science and Technology, S. Korea on Dec 10, 2015

HONORS AND AWARDS

- The scholarship for CRA-W/CDC/SIGPLAN Mentoring Workshop at POPL, 2012

RELEVANT COURSEWORK

- Theory: Algorithms, Data Structure, Compilers, Performance Evaluation
- Systems: Operating Systems, Parallel Architecture, Advanced Software Engineering, Artificial Intelligence, Database Systems, Computer Networks, Wireless Networks, Network Security

SKILLS

- Languages: Proficiency in C/C++ (very strong), Java, C#, Python, Assembly (ARM), Matlab, R
- Cluster parallel programming: MPI (MPICH, LAM, Open MPI), OpenMP, GPU (CUDA)
- Cloud system: VMWare vSphere, XEN
- Database programming: MySQL, PostgreSQL
- Mobile Phone Debugger Tool: Trace32(JTAG / ICE debuggers), QXDM
- Networking: TCP/IP, Socket Programming
- Operating Systems: Linux (Fedora, Ubuntu, RHEL), Windows Family