Christopher A. Wood

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EDUCATION

Master of Science, Computer Science, expected 08/2013
Bachelor of Science, Software Engineering and Computer Science, expected 08/2013
Rochester Institute of Technology, Rochester, NY

Concentrations: Computational Mathematics and Computer Engineering
Minors: Mathematics and Writing Studies
GPA: 3.97/4.0 (Primary Field of Study GPA: 4.0/4.0)

MS Thesis: "Optimal Representations of Cryptographically Significant Vectorial Boolean Functions", expected 08/2013, under development.

Relevant coursework:
Algorithms, Data Communications and Networks, Intelligent Security Systems, Compiler Construction, Optimization Methods, Operating Systems, Programming Language Concepts, Computer Organization, Computer Science Theory, Number Theory, Graph Theory, Linear Algebra, Discrete Mathematics, Real-time and Embedded Systems, Performance Engineering of Real-time and Embedded Systems, Concurrent Systems, Software Formal Methods, Engineering of Software Subsystems, Software Architectures, Software Testing, Professional Communications, Technical Writing.

PUBLICATIONS

1. C. Wood and J. Jacob, "Forbidden Subtree Construction Techniques for Trees Under the $L(2,1)$-Labeling Problem on Trees," in preparation.
2. C. Wood and J. Jacob, "Characterization Results for the $L(2,1)$-Labeling Problem on Trees," in preparation.
3. P. Bajorski, A. Kaminsky, M. Kurdziel, M. Lukowiak, S. Radziszowski, and C. Wood, "Statistical Analysis and Modeling of a Tree-Based Group Key Distribution Method in Tactical Wireless Networks," submitted.
4. M. Lukowiak, S. Radziszowski, J. Vallino, C. Wood, "Cybersecurity Education: Bridging the Gap between Hardware and Software Domains," submitted.
5. M. Lukowiak, A. Meneely, S. Radziszowski, J. Vallino, and C. Wood, "Developing an Applied, Security-Oriented Computing Curriculum," In Proceedings of the ASEE 2012, San Antonio, Texas. June 2012.
6. C. A. Wood, "Chaos-Based Symmetric Key Cryptosystems," In Proceedings of the 2011 International Conference on Security & Management, Las Vegas, Nevada, USA. July 2011.
7. C. A. Wood and R. K. Raj, "Keyloggers in Cybersecurity Education," In Proceedings of the 2010 International Conference on Security & Management, Las Vegas, Nevada, USA. July 2010.

INVITED TALKS

1. C. Wood, Characterization Results for the L(2,1)-Labeling Problem on Trees, AMS Sectional Meeting, Rochester Institute of Technology, Rochester, NY, September, 22 2012.

POSTER PRESENTATIONS

1. C. A. Wood, "Layered Driver Rootkit Detection on Microsoft Windows PCs", Poster Presentation, RIT Undergraduate Symposium, August 2009.

RESEARCH EXPERIENCE

Secure Logging Schemes for Cloud-Based SaaS Architectures 9/12 - present
Advisors: Dr. Rajenda K. Raj (RIT Computer Science Department) and Dr. Andy Meneely (RIT Software Engineering Department)

- Reconstructing a cloud-based secure logging architecture that leverages ciphertext-policy attribute based encryption (CP-ABE) for log file integrity.
- Conducting a literature survey on past and present secure logging architectures.

Keyboard Biometric-Based Continuous Authentication Schemes 9/12 - present
Advisor: Dr. Leon Reznik (RIT Computer Science Department)

- Implementing a real-time keyboard keylogger and feature extraction engine for use in continuous authentication schemes.
- Comparing classifiers based on dynamic free-form text input against those based on structured text-input.
- Conducting a survey on past and present keyboard-based biometric authentication schemes.

Wireless Ad-hoc Network Group Key Management 5/11 - present
Advisors: Dr. Stanisław Radziszowski (RIT Computer Science Department), Dr. Marcin Lukowiak (RIT Computer Engineering Department), Dr. Peter Bajorski (RIT Graduate Statistics Department), Dr. Michael Kurdziel (Harris RF Communications Division)

- Focusing on a group key management protocols for wireless ad-hoc radio networks with constrained channel bandwidths and computational power.
- Exploring solutions based on public- and private-key cryptosystems with varying levels of pre-placed radio data for node authentication and key generation.
- Implementing network simulators in SMURPH/SIDE and NS3 to obtain empirical performance measurements for proposed protocols.
- Implementing a SPIN model to check the correctness of our protocol (i.e. its adherence to the specification).
- Developing a theoretical mathematical model to compare with quantitative performance metrics.

$L(2,1)$-Labeling Problem 9/11 - 9/12
Advisor: Dr. Jobby Jacob (RIT School of Mathematical Sciences)

- Studied previous results from the $L(2,1)$-labeling problem on trees.
- Implemented a dynamic programming labeling algorithm to assist in the study of tree characterization.
- Developed tree construction algorithms that are capable of producing infinitely many trees T with a label span of $(\Delta(T)+2)$.
- Made progress in the complete $L(2,1)$ label span characterization of trees up to twenty vertices using the aforementioned labeling algorithm and nauty graph generation program.
- Briefly investigated the $L(2,1)$-labeling problem on cubic bipartite graphs.

Secure Operating System Design Principles 3/11 - 6/11
Advisor: Dr. Rajenda K. Raj (RIT Department of Computer Science)

- Researched secure operating system design principles at all levels of the software stack.
- Conducted case studies for a variety of popular operating systems with different purposes, including Microsoft Singularity, Chrome OS, Android (the entire stack), QNX, and Microsoft Azure.
- Began developing a primitive operating system, virtual machine, and programming language to explore the implementation aspects of secure systems.

Rootkit Design, Implementation, and Detection 6/09 - 3/10
Advisor: Dr. Rajendra K. Raj (RIT Department of Computer Science)

- Explored malware rootkits that targeted the Windows NT family of operating systems.
- Studied user-mode and kernel-mode rootkit implementations and state-of-the-art static and dynamic techniques.
- Developed a Windows NT filter driver in C to help determine the presence of keystroke-monitoring malware (targeted towards a specific rootkit implementation).

PROFESSIONAL EXPERIENCE

Intel Corporation, Virtual and Parallel Computing Group (VPG) 6/12 - 8/12
Graphics Software Engineer Intern Folsom, CA

- Developed production features for language transformation software for hardware specifications to test platform source files.
- Interacted with internal customers within the VPG to utilize debug tools and environments for architecture specification and post-silicon testing.
- Drove a large refactor of an existing system to make use of multiple design patterns, including the Factory, Decorator, and Adapter patterns.

L-3 Communications, Linkabit Division 3/11 - 8/11
Software Engineer Intern Victor, NY

- Designed and implemented a library and supporting drivers for the u-blox NEO5/6 GPS receiver to be driven by an Analog Devices Blackfin processor.
- Extended an existing FAT file system driver to add support for SD devices.
- Improved functionality of an existing CPLD design used to control the power supply in an embedded system.
- Responsible for managing an internal project build machine using Cruise Control and running Coverity static analysis tools on C/C++ projects to obtain defect reports.

Rochester Software Associates 11/10 - 3/11
Software Engineer Intern Rochester, NY

- Led the design, development, and documentation efforts for a new printer job management application that would service any number of jobs from clients across the network.
- Tested and debugged an existing implementation of the LPD protocol.

C Speed, LLC 5/10 - 8/10
Software Engineer Intern Liverpool, NY

- Implemented embedded firmware features and test routines in C, C++, and Assembly for Coldfire V2 processors.
- Designed and implemented an internal manufacturing part supply management system.

TEACHING EXPERIENCE

RIT Software Engineering Department 2/11 - present
Teaching Assistant Rochester, NY

- Helped design and teach a new course entitled "Hardware and Software Design with Cryptographic Applications".
- Developed lecture material on real-time and embedded software optimization techinques and the Impulse C high-level synthesis tool.
- Prepared and presented material on software application profiling and optimization techniques.

- Assisted students with weekly assignments and graded lab and project deliverables.
- Porting the AES cache timing attack on a Xilinx ML507 platform with MicroBlaze soft-core processor for student labs.

RIT Computer Science Department 12/09 - present
Computer Science I, II, and IV Lab Assistant Rochester, NY

- Run weekly lab meetings and problem solving sessions with brief lectures to cover weekly material.
- Hold four tutoring office hours per week to assist students in need.
- Grade weekly lab assignments and midterm examinations.

RIT Software Engineering Department 12/11 - 3/12
Personal Software Engineering Teaching Assistant Rochester, NY

- Assisted students with in-class programming assignments and course projects.
- Graded student projects, including those based on the C and Ruby programming languages.

RIT Software Engineering Department 9/11 - 12/11
Engineering of Software Subsystems Teaching Assistant Rochester, NY

- Assisted students with in-class exercises and unit questions based on a subset of the design patterns taught during the course.
- Spent time with each student team to discuss course projects, including design decisions, application of design patterns, and alternatives considered.
- Graded course project implementations unit questions.

ACADEMIC AND PERSONAL PROJECTS

- Replicating the published cache timing attack on LUT-based implementations of the Advanced Encryption Standard on an FPGA-based embedded system.
- Implemented a fully-compliant FTP client with a text-based interface in Java (approximately 2,000 lines of code).
- Led the development effort for a four-person team that worked on a Kanban taskboard web application using Adobe Flex, Flash, BlazeDS, Hibernate, Jasper Reports, and Java (approximately 10,000 lines of code).
- Led team to develop a Java-based medical image viewing and reconstruction system featuring image scrolling and multi-axis reconstructions of X-ray, CT scan, and MRI images in various file formats (approximately 6,500 lines of code).

HONORS AND AWARDS

- Golisano College of Computing and Information Sciences (GCCIS) and RIT Honors Program, Member.
- RIT Tau Beta Pi Engineering Honors Society, Member.
- Student mentor for the FIRST LEGO League team hosted by RIT, 2009-2011.
- Recipient of GCCIS Honors research assistantship award for Winter 2009-2010 and Spring 2011.
- Recipient of RIT Undergraduate Research Award stipend for Summer 2009.
- Appointed to GCCIS Dean's List (Fall 2008 - present).

PERSONAL INTERESTS

- Marathon finisher, full 42km Lake Placid Marathon, June 12, 2011, 4:29:15 completion time.
- Acoustic and electric guitar, 3 years.