

JESSE HARTLOFF

286 N. Ivyhurst rd.
Amherst, NY 14226
716-785-0829
hartloff@buffalo.edu

EDUCATION

University at Buffalo
Ph.D. in Computer Science Summer 2015
Major Professor: Dr. Atri Rudra
Dissertation: Template Security in Fingerprint Matching Systems

University at Buffalo
B.S. in Computer Science Fall 2011
B.S. in Business Administration Fall 2011
B.A. in Mathematics Fall 2011

HONORS

University at Buffalo, Computer Science and Engineering
Presidential Scholarship 2011-15

University at Buffalo, School of Engineering and Applied Sciences
Presidential Scholarship 2011-12

University at Buffalo, Computer Science and Engineering
Senior Scholarship 2010-11

University at Buffalo, McNair Scholars Program
Ronald E. McNair Scholarship 2009-11

University at Buffalo, School of Management
John G. and Elizabeth Gibbons Scholarship 2010-11

University at Buffalo, School of Management
Challen Family Scholarship 2009-10

TEACHING EXPERIENCE

University at Buffalo
Adjunct Professor Summer 2013
CSE331: Introduction to Algorithms

Guest Lecturer for Atri Rudra Fall 2012 - Present
CSE331: Introduction to Algorithms | CSE554: Coding Theory

Teaching Assistant

CSE331: Introduction to Algorithms

Fall 2011**WORK EXPERIENCE**

Fujitsu Labs of America, Sunnyvale, CA

Research Intern

Conducted research on fingerprint template security resulting in a peer-reviewed conference submission to ICB2015 and a patent application.

Fall 2014

CUBRC, Buffalo, NY

Research Intern

Researched new ideas for entity resolution and implemented them in Java for big data using tools such as Hadoop, storm, SPARQL, and tomcat.

Summer 2014

United States Air Force Reserves, Niagara Falls, NY

Aerospace Maintainer

Performed maintenance tasks on C-130 aircraft and trained new recruits.

2007 - 2013

Skylighters of New York, Orchard Park, NY

Pyrotechnician, occasionally

Responsible for the safe and efficient execution of fireworks displays at community events throughout the Buffalo region.

2013 - Present**PUBLICATIONS**

[1] M. Morse, J. Hartloff, T. Efland, J. Schuler, J. Cordaro, S. Tulyakov, A. Rudra, and V. Govindaraju. Secure fingerprint matching with generic local structures. In *CVPR Workshops*, 2014.

[2] T. Efland, M. Scheggenburger, J. Schuler, B. Zhang, J. Hartloff, J. Dobler, S. Tulyakov, A. Rudra, and V. Govindaraju. Secure fingerprint hashes using subsets of local structures. In *SPIE Defense, Security, and Sensing*, 2014.

[3] J. Hartloff, J. Dobler, S. Tulyakov, A. Rudra and V. Govindaraju. Towards fingerprints as strings: Secure indexing for fingerprint matching. In *International Conference on Biometrics (ICB)*, 2013.

[4] J. Hartloff, M. Bileschi, S. Tulyakov, J. Dobler, A. Rudra and V. Govindaraju. Security analysis for fingerprint fuzzy vaults. In *SPIE Defense, Security, and Sensing*, 2013.

PRESENTATIONS

[P1] Towards fingerprints as strings: Secure indexing for fingerprint matching. In *International Conference on Biometrics (ICB)*, 2013, poster.

[P2] Security analysis for fingerprint fuzzy vaults. In *International Conference on Biometrics (ICB) Doctoral Consortium*, 2013, poster.

[P3] Graduate student panel. In *McNair Research Conference*, 2013.

[P4] Security analysis for fingerprint fuzzy vaults. In *SPIE Defense, Security, and Sensing*, 2013.

[P5] Traitor tracing and revocation for broadcast encryption schemes. In *Coding, Complexity, and Sparsity Workshop (SPARC)*, 2013, poster.

[P6] Matching methods for privacy preserving indexed fingerprint templates. In *Center for Identification Technology Research (CITeR)*, 2013, poster.

[P7] Secure fingerprint matching. In *Cryptography and Principles of Security Summer Schools at Penn State*, 2012, poster.

[P8] Coding theory. In *McNair Research Conference*, 2011.

[P9] Issues in streaming algorithms for formal languages. In *McNair Research Conference*, 2010.

MENTORING

Managed and led undergraduate and master's students through their first exposure to research level work resulting in peer-reviewed publications coauthored by every mentee.

Spring 2014

Matthew Morse, B.S. in Computer Science (NSF REU)

Jim Schuler, B.S. in Mathematics (NSF REU)

Thomas Effland, B.S. in Mathematics (NSF REU)

Jennifer Cordaro, M.S./B.S. combined degree in Computer Science (Volunteer)

In the spring of 2014, these students and I continued our previous work exploring sets of local structures to represent fingerprints with the goal of fingerprint template security. We developed a method of reducing security risks by utilizing multiple servers resulting in a submission to ICB2015 that is currently under review. I met with these students several times each week as we coded in Java to test our ideas. During this time, I stressed the importance of object-oriented principles and design patterns to show my mentees how to organize their code as the project grew larger and advised the students as they prepared for the next step in their careers.

Spring 2013, Summer 2013, Fall 2013

Mariel Schneggenburger, B.S. in Mathematics (URGE to Compute)

Jim Schuler, B.S. in Mathematics (URGE to Compute)

Thomas Effland, B.S. in Mathematics (URGE to Compute)

Jennifer Cordaro, M.S./B.S. combined degree in Computer Science (Volunteer)

Matthew Morse, B.S. in Computer Science (NSF REU, Fall 2013 only)

Throughout 2013, I mentored a total of 5 students as we performed research and developed software in C++ and Java with the goal of providing template security in fingerprint matching systems. During the spring semester, they worked part-time and we met weekly to discuss their progress on research tasks. Over the summer, I worked with them daily as we developed software to test our idea of representing fingerprints as sets of local structures to enhance matching accuracy in our template security systems. We continued to meet several times each week in the fall semester as we prepared our work for submissions [1] and [2]. My role included dividing the project into small pieces that I assigned to the appropriate students based on their specific skills, then working with them as they completed these tasks. I taught

many programming lessons as the students learned how to effectively code in a team on a large project, helped them adjust from undergraduate to research-level work, and dealt with contention between group members.

Summer 2012

Maxwell Bileschi, M.S. in Mathematics and B.S. in Computer Science (RA)

In the summer of 2012, Maxwell and I worked together on a daily basis implementing software in C++ to test the fuzzy vault scheme for fingerprint template security resulting in publication [4]. During this time, I was able to teach Maxwell about performing research-level work and advised him as he explored his future career options.

RESEARCH PROJECTS

Fingerprint Template Security

Spring 2012 - Present

Atri Rudra, Venu Govindaraju

The purpose of my PhD thesis work is to secure fingerprint templates to prevent attackers who obtain these templates from recovering the underlying fingerprint data while allowing unencumbered access for genuine users. The results of this project include a security measure for the fuzzy vault scheme, a novel indexing method for fuzzy vaults, and methods of representing a fingerprint as a set of local structures to enhance matching accuracy in a template security system. This research has led to publications [1]-[4], numerous presentations, and two ICB2015 submissions that are currently under review.

Entity Resolution

Summer 2014

Greg Tauer

As a research intern at CUBRC, I worked with Greg Tauer developing new methods for entity resolution on large databases and implemented these ideas in Java. The goal of this work is to identify and merge information referring to the same entity when combining databases with different schema including structured and unstructured data. Our work is currently implemented and being used at CUBRC.

Coding Theory

Fall 2010 - Summer 2011

Atri Rudra

As a Senior Scholar and through the McNair Scholars Program, I Worked with Atri Rudra to find an explicit binary error-correcting code that meets the Gilbert-Varshamov bound at a rate of $\frac{1}{2}$. Our approach was to represent the codewords as binary polynomials and utilize the structure of these polynomials to arrive at the desired property, as well as running simulations in MATLAB. I presented our progress on this problem at the 2011 McNair Research Conference in presentation [P8].

Streaming Algorithms

Summer 2010

Kenneth Regan

Through the McNair Scholars Program, I Worked with Kenneth Regan to perform theoretical research on streaming algorithms for formal languages. The goal of this work was to develop an efficient streaming algorithm that solves the balanced problem for higher-order Dyck languages. It is theorized that an algorithm solving these languages can be used to solve all context-free languages. I presented our progress on this problem at the 2010 McNair Research Conference in presentation [P9].