

TRAVIS ATKISON, PH.D., CISSP

ASSISTANT PROFESSOR OF COMPUTER SCIENCE

COLLEGE OF ENGINEERING AND SCIENCE

LOUISIANA TECH UNIVERSITY

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RESEARCH INTERESTS Computer Security, Software Assurance, Network Security, Computer Forensics, Software Engineering, Knowledge Discovery and Data Mining, Information Retrieval

CLEARANCE SECRET

EDUCATION **Ph.D., Computer Science** – Mississippi State University, Mississippi State, MS, Aug 2009

- Thesis Title: Applying Randomized Projection to Aid Prediction Algorithms in Detecting High-Dimensional Rogue Applications
- Advisor: Dr. Rayford Vaughn

M.S., Computer Science - The University of Alabama, Tuscaloosa, AL, Dec 1997

B.S., Electrical Engineering - The University of Alabama, Tuscaloosa, AL, Dec 1995

- Computer Engineering Option

B.S., Computer Science - The University of Alabama, Tuscaloosa, AL, Dec 1995

- Minor: Mathematics

ACADEMIC EXPERIENCE

September 2009 to present **Louisiana Tech University**, Ruston, LA
College of Engineering and Science
Assistant Professor of Computer Science

Research Experience

- Designing and developing methods and techniques for the detection of malicious software applications using technologies from information retrieval and data mining. Specifically this work is using data reduction concepts from randomized projection and prediction methods based on cosine similarity.
- Spearheading an effort geared toward developing next generation digital forensics analysis techniques. These efforts are looking at improving end user training as well as developing sophisticated techniques and methodologies.

Teaching Experience

- CSC 554 Advanced Networks – Fall 10
- CSC 499/557 Computer Forensics – Spring 10
- CSC 450 Computer Networks – Winter 09-10
- Guest Lecturer
 - CSC 499 Cyber Security – Spring 10

*August 2005 to
August 2009*

Mississippi State University, Mississippi State, MS
Department of Computer Science and Engineering

Graduate Research Developer/Programmer

- Worked as a team member on a project designed to develop high performance remote visualization of large data sets. Developed secure login capability based on DOD customer input using Kerberos.
- Developed next generation data collection capability for an anomaly detection system-testing framework.
- Worked on effort to develop visualization techniques geared at aiding undergraduate students to better understand complicated algorithmic concepts.

Lecturer

- CSE 2383 Data Structures and Analysis of Algorithms – Fall 08, Summer 08, Summer 07
- CSE 1233 Computer Programming with C – Fall 07
- Guest Lecturer
 - CSE 4243/6243 Information and Computer Security – Spring 07, Spring 08
 - CSE 4273/6273 Introduction to Cyber Crime and Computer Forensics – Fall 07
 - CSE 2383 Data Structures and Analysis of Algorithms – Spring 09, Spring 08

*November 1993 to
March 1998*

The University of Alabama, Tuscaloosa, AL
Department of Computer Science

Undergraduate Research Developer/Programmer

- Worked as a team member on the large-scale information-mining project funded by the Alabama Department of Transportation and utilized by local governments at the state, county and city levels. The software received a National Public Service Award from U.S. Department of Transportation and the National Highway Safety Administration.
- Responsibilities included new development, software maintenance and testing and configuration management.
- Developed data and statistics for a statewide planning manual.

Graduate Research Developer/Programmer

- Worked as a team member on a large-scale, information-mining project described above.
- Project involved data analysis and information mining of large data sets, with particular emphasis on highway safety data analysis.
- Project was developed as a Microsoft Windows application utilizing Visual C++ and Microsoft Foundations Classes and was ported to the World Wide Web using HTML and CGI.
- Responsibilities included managing undergraduates, new development, supervised maintenance and testing and configuration management.
- Supervised data collection and reporting for statewide planning manual.

PROFESSIONAL EXPERIENCE

March 1998 to
July 2005

National Security Agency, Fort George G. Meade, MD
Computer Systems Researcher/Computer Scientist

- Lead researcher on a distributed data mining project. Responsible for designing and developing overall system architecture. Lead team of software engineers to develop prototype system. Gained experience in architecture and prototype development as well as ensemble and hierarchical modeling methodologies and techniques.
- Served as data mining expert on information retrieval project to substantially improve the ability to distinguish two or more data classes when they differ greatly in size. Created feature extraction and derivation applications as well as implemented multiple statistical methods. Utilized ensemble and hierarchical modeling techniques and gained a 10% accuracy increase over single model results.
- Developed multiple tools for intrusion detection and network analysis. These tools, written using the libpcap library, are used to analyze large repositories of network data as well as live network traffic and provide unique capabilities to summarize, reconstruct, filter, search and analyze network data.
- Considered by peers as an expert in the data mining field and have consulted on various data mining, information retrieval and intrusion detection projects across the enterprise. Projects include:
 - Lead researcher on effort to more accurately satisfy user requirements. Effort involved extracting and deriving features, predictive modeling building and ensemble modeling techniques. Two teams were given this task; the models our team developed were able to accurately predict customer needs 30% better than the competing team, allowing the customer to better satisfy their requirements.
 - Lead architect on effort to implement distributed data mining architecture in customer environment. Worked directly with customer and applied knowledge gained from previous research to solve this mission critical requirement.
- Designed and developed parallel applications for 8 and 16 node Beowulf clusters using the LAM/MPI programming environment and development system.
- Received multiple letters of appreciation and cash awards for exemplary work and customer service.

PROFESSIONAL CERTIFICATIONS

Certified Information Systems Security Professional (CISSP) since February 21, 2003.

- Member ID: 44455

PATENTS

Received a patent (classified) in June 2007 for an idea developed while at the National Security Agency

PUBLICATIONS**Journal Articles (reverse chronological order):**

1. R J Vickery, A Cedilnik, J P Martin, Y Dandass, T Atkison, R J Moorhead, J Clarke, and P Adams, "Web-based Secure High Performance Remote Visualization," *Journal of Physics: Conference Series 46, SciDAC 2006*, pages 545-549.

Conference Proceedings (reverse chronological order):

1. T. Atkison, "Aiding Prediction Algorithms in Detecting High-Dimensional Malicious Applications Using a Randomized Prediction Technique," *The 48th ACM Southeast Conference*, Oxford, MS, April 2010, ACM

2. B. Malone, T. Atkison, M. Kosa, and F. Hadlock, "Pedagogically Effective Effortless Algorithm Visualization with a PCIL," *Frontiers in Education 39th Annual Conference*, San Antonio, Texas, October 2009, IEEE.
3. T. Atkison, "Applying Randomized Projection to aid Prediction Algorithms in Detecting High-Dimensional Rogue Applications," *The 47th ACM Southeast Conference*, Clemson, SC, March 2009, ACM.
4. T. Atkison, "Using an Information Retrieval Technique to Discover Malicious Software," *In the Proceedings of the 12th World Multi-Conference on Systemics, Cybernetics and Informatics*, Orlando, FL, June 2008, IIS, pages 284-289.
5. R Vickery, A Cedilnik, J Martin, Y Dandass, T Atkison, R Moorhead, P Adams and J Clarke, "Web-based High Performance Remote Visualization," *In the Proceedings of the 17th Annual Department of Defense High Performance Computing Modernization Program's (HPCMP) Users Group Conference*, Pittsburgh, PA, June 2007, IEEE Computer Society.
6. T. Atkison, K. Pensey, C. Nicholas, D. Ebert, R. Atkison and C. Morris, "Case Study: Visualization and Information Retrieval Techniques for Network Intrusion Detection," *In Proceedings of the Third IEEE Eurographics Visualization Symposium*, Ascona, Switzerland, May 2001, Springer, pages 283-290.
7. L Butler, T Atkison, and E Miller, "Comparing CPU Performance Between and Within Processor Families," *Proceedings of the 25th Annual International Conference on Computer Measurement and Performance (CMG 2000)*, Orlando, FL, December 2000, pages 421-430.

Technical Reports and Other Publications (reverse chronological order):

1. R Vickery, A Cedilnik, J Martin, Y Dandass, T Atkison, R Moorhead, J Clarke and P Adams, "Remote Visualization of Large Datasets," Invited Poster, *SciDAC 2006 Conference*, Denver, CO, 25-29 June 2006.
2. R Vickery, A Cedilnik, R Moorhead, Y Dandass, T Atkison and J Martin, "WebVis Secure Communications Model and Preliminary Performance Study," *RMV-KY5-001 Technical Report*, 1 December 2005.
3. T Atkison, H Kargupta and C Nicholas, "Dimensionality Reduction Using a Randomized Projection Algorithm: Preliminary Results," *University of Maryland Baltimore County Technical Report TR-CS-01-11*, September 2001.

Student Publications

1. J Durand, "Preventing Phishing Attacks on OpenID Using a CAPTCHA-based Technique," *2010 ACM Mid-Southeast Conference*, Gatlinburg, TN, November 2010, ACM.
2. J Flores, "An Analysis of Unauthorized System Login Access by Using Dynamic Kernel Patching and Live System Intrusion Attacks," *2010 ACM Mid-Southeast Conference*, Gatlinburg, TN, November 2010, ACM.
3. T Helsper, "Comparison of Graph Pathfinding Algorithms," *The 47th ACM Southeast Conference*, Clemson, SC, March 2009, ACM.

PRESENTATIONS

Invited Presentations (reverse chronological order):

1. T. Atkison (speaker), "Applying and Interviewing for a Faculty Position," Presented at the Louisiana Tech University COES Office for Women in Science and Engineering Graduate Seminar, March 12, 2010.
2. T. Atkison (speaker), "Applying Dimensionality Reduction Techniques to Attack the

- Malicious Software Detection Problem,” Presented at the University of Texas at Tyler, April 23, 2009.
3. T. Atkison (speaker), “Applying Dimensionality Reduction Techniques to Attack the Malicious Software Detection Problem,” Presented at Sam Houston State University, March 17, 2009.
 4. T. Atkison (speaker), “Applying Dimensionality Reduction Techniques to Attack the Malicious Software Detection Problem,” Presented at Louisiana Tech University, February 26, 2009.
 5. T. Atkison (speaker), “Applying Dimensionality Reduction Techniques to Attack the Malicious Software Detection Problem,” Presented at Stephen F. Austin, February 16, 2009.
 6. T. Atkison (speaker), “Applying Dimensionality Reduction Techniques to Attack the Malicious Software Detection Problem,” Presented at the *Department of Computer Science Research Colloquium Series*, The University of Alabama, Tuscaloosa, Alabama, October 24, 2008.

Conference Presentations (reverse chronological order):

1. T. Atkison (speaker), “Aiding Prediction Algorithms in Detecting High-Dimensional Malicious Applications Using a Randomized Prediction Technique,” *The 48th ACM Southeast Conference*, Oxford, MS, April 17, 2010.
2. T. Atkison (speaker), “Applying Randomized Projection to aid Prediction Algorithms in Detecting High-Dimensional Rogue Applications,” *The 47th ACM Southeast Conference*, Clemson, SC, March 20, 2009
3. T. Atkison (speaker), “Using an Information Retrieval Technique to Discover Malicious Software,” *The 12th World Multi-Conference on Systemics, Cybernetics and Informatics*, Orlando, FL, June 2, 2008.
4. T. Atkison (speaker), K. Pency, C. Nicholas, D. Ebert, R. Atkison and C. Morris, “Case Study: Visualization and Information Retrieval Techniques for Network Intrusion Detection,” *The Third IEEE Eurographics Visualization Symposium*, Ascona, Switzerland, May 30, 2001.

GRANTS

1. PI, “Developing an Effective Dimensionality Reduction Methodology for Malicious Software Detection Predictors,” July 2010, AFOSR, \$50,150.
2. PI, “Forensics in a Virtual Environment,” July 2010, AFOSR, \$40,311.
3. Co-PI, “Louisiana Tech University Proposal for the Cybersecurity Research Program at the Cyberspace Research Laboratory,” July 2010, AFOSR, \$1,189,458.

PROPOSALS

1. PI, “Exposing the NetPrint,” March 2010, DARPA (Cyber Genome Program), \$1,565,738.
2. Co-PI, “CYEN: A Roadmap to Creating and Developing Cyber Engineering at Louisiana Tech University,” January 2010, DHS, \$69,484.
3. PI, “Cyber-Crime Initiative: A Partnership Between Louisiana State Police and Louisiana Tech University,” January 2010, Louisiana State Department of Public Safety and Corrections, \$38,755.
4. Co-PI, “Identifying Vulnerabilities from Binary Executable Code Characteristics,” November 2009, IARPA, \$904,712.
5. Co-PI, “CASE: Contained Automated Software Environment,” November 2009, IARPA, \$1,280,618.

**PROFESSIONAL
ACTIVITIES****Program Committee:**

1. Fifth International Conference on Information Systems, Technology and Management, Gurgaon, India, 10 – 12 March 2011.
2. Third Cyberspace Research Workshop, Shreveport, LA, 15 November 2010.
3. Third International Conference on Contemporary Computing, Noida, India, 9 – 11 August 2010.

Reviewer:

1. Third International Conference on Contemporary Computing, Noida, India, 9 – 11 August 2010.
2. Digital Forensics – Pedagogy and Foundational Research Activity minitrack at the 43rd Hawai'i International Conference on System Science (HICSS-43), Kauai, HI, 5 – 8 January 2010.
3. Information Systems Security and Privacy track at the International Conference on Information Systems 2009 (ICIS 2009), Phoenix, AR, 15 – 18 December 2009.
4. ACM Southeast Conference (ACMSE 2009), Clemson, SC, 19 – 21 March 2009.

Session Chair

1. ACM Southeast Conference (ACMSE 2010), Oxford, MS, 15 – 17 April 2010.
2. ACM Southeast Conference (ACMSE 2009), Clemson, SC, 19 – 21 March 2009.

MENTORING**Committees Chaired:**

- Joshua Hammons (M.S.)
- Juan Flores (M.S.)
- Jan Durand (M.S.)

Committees Attended:

- Olomola Afolabi (M.S.)
- Hend Nuhait (M.S.)
- Justin Poole (M.S.)
- David Irakiza (Ph.D.)
- Ankunda Kiremire (Ph.D.)
- Khandaker Abir Rahman (Ph.D.)
- Peng Shao (Ph.D. University of Alabama)

HONORS

Recipient of the James Worth Bagley PhD Fellowship

Recipient of the Joseph Barrier Graduate Fellowship

Phi Kappa Phi, National Honor Society

Upsilon Pi Epsilon, National Honor Society for Computer Science

President, 2008-2009

University of Alabama's Engineering Science and Mechanics Role of Honor