Victor C. Valgenti

1205 East Broadway Missoula MT 59802

(406)-243-7913

victor.valgenti@umontana.edu

EDUCATION

2007-2012   **Washington State University (Pullman, WA)   Ph.D. in Computer Science**
Researched Computer Networks with an emphasis on Computer Security. Research projects included: Simulation of computer network traffic for evaluation of Network Intrusion Detection Systems (NIDS); Anonymization of network traffic captures; Sampling to improve NIDS efficiency; Evaluating at-scale GridStat under pandemic conditions; and efficient regular expression matching for dynamic deep-packet inspection.

1999-2002   **City University (Bellevue, WA)   Masters of Science in Computer Systems**
Studied software development and the design, implementation, and management of Information Systems.

1989-1993   **University of Montana BA in French/Linguistics and English/Linguistics**
Double-major in French and English with an emphasis in Linguistics in both. TESL certified.

AWARDS

2009-2010   **Washington State University CEA Teaching Assistant of the Year**
Washington State University EECS Teaching Assistant of the Year

EXPERIENCE

2019   **Missoula College–UMT (Missoula, MT) Program Director–Assistant Professor**
Serving as Program Director and primary faculty for the Information Technology program at Missoula College. Duties include: Scheduling and managing courses taught; updating and creating curriculum to meet students and business needs; advising and mentoring students; teaching courses in Networking, Operating Systems, Programming, and Cyber Security; Participating in committees such as the Faculty Evaluation Committee (FEC) and the Instructional Planning Group for response to COVID-19; and submitting grant proposals and managing those grants. I was the Principal Investigator for a GenCyber Summer Camp for Summer 2021 ($40k) and am an active participant in other grants totaling more than $200k.

2013 - 2022   **Petabi, Inc (Irvine, CA) VP Research**
I directed, managed, and implemented research efforts to create unified security solutions utilizing regular expressions as a key component. Under my tenure we implemented: high-speed regular expression matching capable of processing 1 gigabit

on a single core(patented); a core framework for abstracting event data into a normalized language enabling the search and identification of higher level patterns across diverse data and systems (patented); a mutational algorithm to create and optimize regular expression patterns against noise (patented); and clustering and semi-supervised machine learning to derive event classifications and correlations from event histories. Languages used: C/C++, Lua, and Python.

Fall 2012	**Washington State University (Pullman, WA)**	**Adjunct Professor**

Taught CptS 455 Introduction to Computer Networking at Washington State University. This class is a Computer Science focused look into Network Programming. The course explores fundamental Networking concepts such as the operation of TCP; IP Routing; programming with network sockets in C; and examining the many interesting aspects and problems encountered in distributed and network environments. Languages used: C/C++ and Perl.

2010-2013	**Schweitzer Engineering Laboratory (SEL) (Pullman, WA)**	**Software Engineer**

Worked toward the advancement, maintenance, and evaluation of network protocols used in SEL products. Specific projects included development of automated testing infrastructure for the Distributed Network Protocol (DNP 3.0); creation of a high-precision traffic simulator for IEC61850 sampled value traffic with less than 10 microsecond latency (through use of GPS clocks); and design and specification of a high-speed test infrastructure for SEL products. Languages used: C/C++ and Perl.

Summer 2009	**Pacific Northwest National Laboratory (Richland, WA) Ph.D. Intern**

Worked on the Security Assessment Simulation Toolkit (SAST) project at Pacific Northwest National Laboratory. SAST was a platform for simulating large-scale networks using only commodity hardware. Became an expert user, created the documentation for the software, and created attack-traffic and normal-traffic scenarios for use–including a fully automated demonstration. Languages used: Python.

2003 - 2007	**City College at Montana State University (MSU) Billings (Billings, MT)**

Instructor/Program Director Created curriculum, implemented, and taught the Computer Programming and Application Development AAS degree. Taught programming (Java, VB .NET, and Perl); web development (Flash, CSS, HTML); database design and implementation (MS Access, MySQL, and SQL Server); and software engineering. In addition to teaching I actively advised students and also helped recruit for the department. I chaired the college curriculum committee for 2 years and worked on the tenure and promotion committee. I also created and chaired the social committee; a committee in charge of organizing faculty/staff events in an effort to bolster relations among employees at the college. I maintained relations with local business and scheduled bi-annual meetings to gather feedback from the community. Languages used: Java, VB .Net, SQL, and Perl.

2002 - 2003	**Montana State Legislative Audit Division (Helena, MT)** Information Systems Auditor

Worked as an Information Systems Auditor for the State of Montana. Reviewed code and systems for flaws and/or security risks and created tools, written in Java, to automatically investigate and enumerate systems. I identified several major risks over

my tenure as an auditor including default access to the state's budgeting database. Languages used: Java.

2000 - 2002   **Education Logistics (Missoula, MT)**   **Head Quality Assurance Engineer**
Worked as the Head Quality Assurance Engineer for the web-based services. I created and maintained the fault-tracking database; planned and performed testing for the web products; built the search engine for the help module; created the help documentation; and designed and specified new modules for the product. Languages used: Java and JSP.

1996 - 2000   **International Language Center (Kumamoto, Japan)**   **Instructor**
Teacher of English as a Foreign Language to students of all ages and levels (as young as 4 and as old as 60). Also coordinated school events and maintained the company's web presence and computer systems. (One-year hiatus 4/98 to 5/99).

1993 - 1996   **Takamori Board of Education (Takamori, Japan)**   **Instructor**
Teacher of English as a Foreign Language at junior high and elementary schools on the Japanese Ministry of Foreign Affairs Japan Exchange Teaching (JET) Program.

PATENTS

March 2021   Patent Number: 10,944,768
Title: System for Automated Signature Generation and Refinement

June 2018   Patent Number: 10,009,372
Title: Method for Compressing Matching Automata through Common Prefixes in Regular Expressions

April 2018   Patent Number: 9,948,664
Title: Method and System for Correlation and Management of Distributed and Heterogeneous Events

PUBLICATIONS

March 2018   Inbok Lee, Victor Valgenti, Min S Kim, and Sung-il Oh, A Heuristic for Constructing Smaller Automata Based on Suffix Sorting and Its Application in Network Security, in IEICE Transactions Foundations of Computer Science, Vol. E101-D, No.3, March, 2018.

Sept 2017   Victor Valgenti, Ya-Wen Lin, Atsuhiro Suzuki, Min Sik Kim, Simulating Exploits for the Creation and Refinement of Detection Signatures, in the proceedings of the 25th IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS), 2017.

August 2016   Min Shao, Min S. Kim, Victor Valgenti, and Jungkeun Park, Grammar-driven Workload Generation for Efficient Evaluation of Signature-based Network Intrusion Detection Systems, in IEICE Transactions on Information and Systems, Vol. E99-D, No. 8, August, 2016.

Dec 2015   Victor Valgenti, and Min Sik Kim, Increasing Diversity in Network Intrusion Detection System Evaluation, in Proceedings of the Global Communications Conference Exhibition and Industry Forum (GLOBECOM), December, 2015.

August 2015   Victor Valgenti, Min Sik Kim, Sung-Il Oh, and Inbok Lee, REduce: Removing Redundancy from Regular Expression Matching in Network Security, in Proceedings of the International Conference on Computer Communications and Networks (ICCCN), August, 2015.

August 2015   Hai Sun, Yan Sun, Victor Valgenti, and Min Sik Kim, OpenFlow Accelerator: A Decomposition-based Hashing Approach for Flow Processing, in Proceedings of the International Conference on Computer Communications and Networks (ICCCN), August, 2015.

Feb 2015   Hai Sun, Yan Sun, Victor Valgenti, and Min Sik Kim, A Highly Deterministic Hashing Scheme Using Bitmap Filter for High Speed Networking, in Proceedings of the International Conference on Computing, Networking and Communications (ICNC), February, 2015.

Dec 2014   Hai Sun, Yan Sun, Victor Valgenti, and Min Sik Kim, A Hierarchical Hashing Scheme to Accelerate Longest Prefix Matching, in Proceedings of the Global Communications Conference Exhibition and Industry Forum (GLOBECOM), December, 2014.

August 2014   Hai Sun, Yan Sun, Victor Valgenti, and Min Sik Kim, TCAM-based Classification Using Divide-and-Conquer for Range Expansion, in Proceedings of the International Conference on Computer Communications and Networks (ICCCN), August, 2014.

May 2014   Victor Valgenti, Hai Sun and Min Sik Kim, Protecting Run-time Filters for Network Intrusion Detection Systems, In Proceedings of the IEEE Conference on Advanced Information Networking and Applications (AINA), May 2014.

Sep 2012   Victor Valgenti, Jatin Chhugani, Yan Sun, Nadathur Satish, Min Sik Kim, Changkyuu Kim, Pradeep Dubey GPP-grep: High-speed Regular Expression Processing Engine on General Purpose Processors, Research in Attacks, Intrusions, and Defenses (RAID formerly Recent Advances in Intrusion Detection) 2012.

March 2012   Victor Valgenti and Min Sik Kim, An Application-level Content Generative model for Network Applications, International ICST Conference on SIMUlation Tools and Techniques (SIMUTools) 2012.

October 2011 Ruma R. Paul, Victor Valgenti and Min Sik Kim, Real-time Netshuffle: Graph distortion for on-line anonymization, International Conference on Network Protocols (ICNP) 2011.

August 2011   Yan Sun, Victor Valgenti and Min Sik Kim, Hierarchical NFA-Based Pattern Matching for Deep Packet Inspection, International Conference on Computer Communications and Networks (ICCCN) 2011.

June 2011	Victor Valgenti, Ruma Paul and Min Sik Kim, Netshuffle: Improving Traffic Trace Anonymization through Graph Distortion, International Conference on Communications (ICC) 2011.
March 2011	Victor Valgenti and Min Sik Kim, Simulating Content in Traffic for Benchmarking Intrusion Detection Systems, International ICST Conference on SIMUlation Tools and Techniques (SIMUTools) 2011.
January 2011	Haiqin Liu, Yan Sun, Victor Valgenti and Min Sik Kim, Trustguard: A Flow-level Reputation-based DDoS Defense System, IEEE Workshop on Personalized Networks.
August 2010	Yan Sun, Haquin Liu, Victor Valgenti, and Min Sik Kim, Hybrid Regular Expression Matching for Deep Packet Inspection on Multi-core Architecture, International Conference on Computer Communications and Networks (ICCCN) 2010.

GRANTS

2022-2023 **Gencyber Summer Camp**

Wrote, received, and am Principal Investigator for a grant to fund another Gencyber Summer camp at two locations: Missoula College and Great Falls College. Gencyber funds education in core cybersecurity concepts for middle school and high school students. This camp includes an 8-week pre-camp, a 1-week full-time summer camp at each school, and then a 4-week post camp. Award $96K.

2021-23 **NCAE Cybersecurity High School Initiative**

Helped submit a grant for the Northwest Centers for Academic Excellence (NCAE) in Cybersecurity hub to support the improvement of high school Cybersecurity education. Will facilitate the grant and teach some classes to train high school faculty. Roughly $12k per year for 3 years for Missoula College.

2021-23 **Centers for Academic Excellence in Cybersecurity (CAE) Regional Hub Collaboration with State Department of Education**

Worked to submit and will support a grant to coordinate cybersecurity education between the CAEs and the State of Montana Department of Education. Up to $6k per year for 2 years.

2020 **Montana Govenor's Emergency Education Relief Grant (GEER)   Missoula College**

Participated in a multi-faceted award to upgrade curriculum offerings at Missoula College. In particular the grant is aimed at fostering collaboration between University of Montana affiliate 2-year colleges, to provide seed money for a Cyber Range at Missoula College, to develop out cloud computing and security education, and to build out offerings in SalesForce. Award $190.

2020 **GenCyber Summer Camp for Students   Missoula College**

Co-authored, received and executed a grant as Principal Investigator to host a one-week Summer Camp for Junior High students in Missoula County. The summer camp will cover the GenCyber cyber security knowledge units and introduce students to computer security as well as working with technology. Award $40k.

2010   **NSF EArly-concept Grants for Exploratory Research (EAGER) Washington State University**

Participated in planning, writing, and implementing an NSF EAGER grant to test the robustness of GridStat infrastructure to pandemic failure. This grant was a collaboration between the GridStat and Network Research Laboratories at Washington State University. Award $100k.

2010   **NSF Travel Grant   Washington State University**

Applied for and received an NSF travel grant to attend the 8th Global Environment for Network Innovation (GENI) Engineering Conference (GEC). Award: $3,500.

2006   **Perkins Professional Development Grant   City College at MSU-Billings**

Applied for and received a Perkins Professional Development Grant to attend the Educator's Symposium at the ACM SIG-PLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications. Award: $3k.

2004   **Perkins Curriculum Development Grant City College at MSU-Billings**

Applied for and received a Perkins Curriculum Development to create a standardized challenge test for the Introduction to Computers course at City College at MSU-Billings. Award: $2k.

SCHOLARSHIPS

2004   **Federal Scholarship to Attend WECS 6   July 2004**

Applied for and received a scholarship to attend the 6th Workshop for Education in Computer Security (WECS) held at the Naval Postgraduate School in Monterey, CA. Consisted of three days of lectures and tutorials on various aspects of computer security and teaching computer security. Ended with a two-day conference discussing various results from computer security education.

SCHOLARLY SERVICE

2022-23	Center for Academic Excellence in Cybersecurity—recertification
2022	Setup and moderated Montana TC
2022	Missoula College IT Program Review (authored)
2022	Review of AWS Cloud Security Course (AWS) Reviewer
2021	City College, Billings Montana Program Review
2020	The Journal of Open Source Software Paper Review
2017	IEEE Computers And Security Paper Review
2016-2017	International Conference on Computer Communications and Networks S & P Track TPC
2016	International Conference on Advances in Computer, Communication, and Services TPC
2015-2017	Petabi, Inc Internship Program Coordinator
2015-2016	Journal of Systems and Software Paper Review
2015	GLOBECOM Session Chair
2015	International Conference on Computer Communications and Networks Session Chair
2013-2014	International ICST Conference on SIMUlation Tools and Techniques (SIMUTools) TPC
2012	SmartGridComm Symposium on Wide-Area Monitoring, Protection and Control Paper Review

2011	Consumer Communications and Networking Conference Workshop on Personalized Networks Paper Review
2011-2020	IEEE Member
2009	International Conference on Information Networking Paper Review

COMMITTEE WORK

2020-	Organized and Manage Advisory Board for IT program	Missoula College
2020-	Missoula College Faculty Association (treasurer)	Missoula College
2019-	Faculty Evaluation Committee Missoula College
Spring 2021	Cyber Security Faculty Search Montana Tech
2020-2022	Instructional Planning Group University of Montana
2004-2007	Curriculum Committee (chair 2 years). City College at MSU-Billings
2005-2007	Social Committee (created committee and chaired for first year) City College (MSU-B)
2005-2005	Promotion and Tenure Committee. City College at MSU-Billings

CLASSES TAUGHT

Spring 2023	CSCI 215E Social and Ethical Issues in CS Missoula College
Fall 2022	BMIS 471 Network and Security Management College of Business
Fall 2022	ITS 214 Network OS: Infrastructure Missoula College
Fall 2022	ITS 289 Professional Certification Missoula College
Spring 2022	CSCI 151 Interdisciplinary CS I Missoula College
Spring 2022, 23	ITS 212 Network OS: Server Missoula College
Fall 2021	ITS 214 Network OS: Infrastructure Missoula College
Fall 2021	ITS 222 Enterprise Security Missoula College
Spring 2021	ITS 279 Cloud Systems Missoula College
Spring 2021, Fall 2021	ITS 289 Professional Certification Missoula College
Spring 2021 - 23	ITS 274 Ethical Hacking and Network Defense Missoula College
Fall 2020	CSCI 240 Databases and SQL Missoula College
Fall 2020-2021	ITS 165 Intro to OS and the CMD line Missoula College
Fall 2020	ITS 212 Network OS: Server Missoula College
Spring 2020	CSCI 135 Fundamentals of Computer Science I Missoula College
Spring 2020	ITS 210 Network OS: Desktop Missoula College
Spring 2020	ITS 279 Cloud Systems Missoula College
Spring 2020	ITS 280 Computer Repair and Maintenance Missoula College
Fall 2019	CSCI 105 Computer Fluency Missoula College
Fall 2019	CSCI 136 Fundamentals of Computer Science II Missoula College
Fall 2019	ITS 165 OS Commands and Scripts Missoula College
Fall 2009	EE 234 Microprocessor Systems—Teaching Assistant Washington State University

Fall 2009   Cpt S 455 Computer Communication Networks—TA Washington State University

Fall 2008 Spring 2009   Cpt S 460 Operating Systems—Teaching Assistant   Washington State University

Fall 2008   Cpt S 360 Operating Systems—Teaching Assistant   Washington State University

Fall 2007   MATH 171 Calculus I—Teaching Assistant   Washington State University

Spring 2007   Installation, Configuration, and Administering Linux–Instructor City College at MSU-B

Spring 2007, 2006   Applied Intermediate Java–Instructor   City College at MSU-Billings

Spring 2007, 2006   Capstone Project–Instructor   City College at MSU-Billings

Spring 2007, 2006   Developing Databases with Microsoft SQL-Server–Instructor City College at MSU-B

Spring 2007, 2006   Software Development and Documentation–Instructor   City College at MSU-B

Spring/Fall 2004-2007 Microsoft Access–Instructor   City College at MSU-Billings

Fall 2006, 2005   Advanced Visual Basic .NET–Instructor   City College at MSU-Billings

Fall 2006, 2005   Introduction to Java–Instructor City College at MSU-Billings

Fall 2004-6   Introduction to Scripting in a Windows Environment–Instructor City College at MSU-B

Spring 2004-6   Advanced Web Design and Development–Instructor City College at MSU-Billings

Spring 2004   Introduction to PowerPoint–Instructor   City College at MSU-Billings

Spring 2004, Fall 2003 Microsoft Excel–Instructor City College at MSU-Billings

Spring 2004, Fall 2003 Introduction to Computers–Instructor City College at MSU-Billings

PROJECTS

2017-   **Automated Signature Creation and Refinement (patented)**
            A system for generating optimized detection signatures for a local environment using
            mutational genesis of exploits (Python, Ruby, C++, Metasploit Framework).

2015-   **REmatch (patented)**
            A full NFA-based, PCRE-compatible, High-speed Regular Expression Matcher (C/C++).

2015-   **REconverge (patented)**
            A system for high-speed distributed heterogeneous correlation, collation, and
            aggregation of system-wide detector events capable of processing hundreds of
            thousands of events a second. Also includes automated identification of events through
            semi-supervised learning as well as correlating events through statistical analysis. (C++,
            Python, and GRPC).

2014-   **REduce (patented)**
            A tool for identifying and removing redundancy from Regular Expression matching.
            REduce allows for the creation of an optimized Non-deterministic Finite Automata (NFA)
            that can be used for matching network data against a set of regular expressions
            indicating suspicious traffic. REduce causes a reduction in size of the NFA by as much as
            half and a speedup in throughput by a factor of 10 or more. About 3,000 lines of C++

2012-   **Sniffles: A Traffic Capture Generator for Evaluating IDS**

Generates traffic intersecting with a target rule-set in order to evaluate the performance of the Intrusion Detection System. Capable of a wide variety of testing from Denial of Service simulation to random traffic generation. Writes traffic to pcap files. Also includes applications for generating random regular expressions as well as random rules. Several thousand lines of Python code. Available on github at: https://github.com/petabi/sniffles.

CERTIFICATIONS

AWS Certified Cloud Practitioner—2021

Sun Certified Java Programmer—2001

COMPTIA A+ Certified Personal Computer Technician—2000

Teaching English as a Second Language—1993

LANGUAGES

Proficient Programming Languages: C/C++ (4), Python (4), Perl (3), Java (2), and Lua(2).

Proficient Auxiliary Programming Languages: SQL (4), HTML (3), json(3), and XML(2).

Proficient Foreign Languages: Japanese (3) and French (1).

rating: 1=basic, 2=competent, 3=confident, 4=good, 5=excellent.

EXTRACURRICULAR

Kendo (Japanese sword fighting) 2nd degree black-belt (ni-dan)

Kyokushin Kai Karate 2nd kyu (roughly brown belt) (ni-kyu)

Aikido 3rd kyu (san-kyu)