HAYAWARDH VIJAYAKUMAR Ph: 954-668-9772
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EDUCATION

- **Ph. D., Computer Science and Engineering (Current, Expected May 2014)**
  The Pennsylvania State University, University Park
  Current GPA: 3.8/4.0
- **Bachelor of Engineering, Computer Science and Engineering (May 2007)**
  Sri Venkateswara College of Engineering, Anna University. Chennai, India
  First class with distinction (85%, 2nd in class of 66)

PROFESSIONAL EXPERIENCE

- **Research Intern – NEC Labs America, Princeton, NJ (May-Aug 2013)**
  Worked on logging and transforming runtime traces of systems within NEC labs into an information flow graph, and subsequent analyses. A novel feature of the information flow graph was modeling OS semantics, tracking information flow not directly visible in traces.
- **Summer Intern - Qualcomm Innovation (Quicinc), Raleigh, NC (May–Aug 2010)**
  Worked as part of team optimizing Linux kernel for Google Chrome netbooks on Qualcomm hardware. I developed software to probe and test graphic stack capabilities in a black-box way, using which several driver bugs were discovered.
- **Research Assistant (Jan 2008 – Current, under Dr. Trent Jaeger)**
  Working on computer security, operating systems and virtualization.
- **Summer Intern – Hexaware Technologies, India (May – July 2005)**
  Developed a teaching aid for Turing Machine in Java

RESEARCH

Operating Systems Security (Dissertation)*:*

- **Process Firewall:** Linux kernel framework to protect processes against resource access attacks by mapping network firewall concepts onto a process ([2]).
- **System-Based Vulnerability Testing:** Simulate an attacker in the OS (Linux) and detect if programs are vulnerable to name resolution attacks. We found *21 new vulnerabilities across 17 programs* in Ubuntu and Fedora distributions ([6]).
- **Locating System-Wide Attack Surfaces:** Instrument SELinux kernel access checks to log process context when malicious input enters a program. We found 81 attack surface points for the Trusted Computing Base in Ubuntu 10.04.2 ([8]).

Cloud Security:

- **Cloud Verifiers and Integrity-Verified Channels:** A framework to provide a secure channel to cloud customers that guarantees connection to only those cloud instances and infrastructure that satisfy the customer's criteria ([1], [3], [7], [10]).

Virtualization and Security Policy Analysis:

- **Xen VMM**: Creation of 'privileged' VMs into which specialized security functionality can be offloaded, to keep the administrative VM small and secure.
- **System Policy Analysis**: Techniques to verify complete mediation and consistency of policies at multiple layers ([5], [11], [12]).

Network Security and Distributed Systems:

- Proposed a modification of shortest path algorithm for distributed systems ([13]). Proposed an algorithmic enhancement to a packet classification algorithm for faster update times ([14]).

SKILLS

Systems: Linux kernel (security/filesystems), Xen VMM, KVM, SELinux
Languages: C/Python (proficient), C++/Java (prior experience)

SECURITY VULNERABILITIES REPORTED

Ubuntu init scripts (arbitrary file create vulnerability (CVE-2011-3151)), lightdm (privilege escalation (CVE-2011-4406)), Icecat browser GNU version of Firefox (Untrusted library search path), x2go VNC server/client (Untrusted library search path), mountall (Untrusted search path), apachectl (privilege escalation (CVE-2013-1048)).

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AWARDS

- USENIX Security 2009, 2012 Student Travel Grant.
- Medal for being placed 6th in The 31st Annual ACM International Collegiate Programming Contest - (**ACM ICPC** 2006), Asia Region.
- Awarded scholarship in first semester of undergraduate study for outstanding performance.

PUBLICATIONS

[1] Joshua Schiffman and Yuqiong Sun and **Hayawardh Vijayakumar** and Trent Jaeger, **Cloud Verifier: Verifiable Auditing Service for IaaS Clouds,** *In Proceedings of the IEEE 1st International Workshop on Cloud Security Auditing (CSA 2013)*

[2] Hayawardh Vijayakumar and Joshua Schiffman and Trent Jaeger, **Process Firewalls: Protecting Processes During Resource Access,** *In Proceedings of the 8th ACM European Conference on Computer Systems (EUROSYS 2013),* [acceptance rate: 17.9% (28/156)]

[3] Trent Jaeger and Divya Muthukumaran and Joshua Schiffman and Yuqiong Sun and Nirupama Talele and **Hayawardh Vijayakumar**, **Configuring Cloud Deployments for Integrity,** *In Proceedings of the Proceedings of the Computer & Security Applications Rendezvous: Cloud and Security (C&ESAR 2012)*

[4] Hayawardh Vijayakumar and Trent Jaeger, **The Right Files at the Right Time**, *In Proceedings of the 5th IEEE Symposium on Configuration Analytics and Automation (SAFECONFIG 2012)*

[5] Divya Muthukumaran and Sandra Rueda and Nirupama Talele and **Hayawardh Vijayakumar** and Trent Jaeger and Jason Teutsch and Nigel Edwards, **Transforming Commodity Security Policies to Enforce Clark-Wilson Integrity**, *In Proceedings of the 28th Annual Computer Security Applications Conference (ACSAC 2012)*, [acceptance rate: 19% (44/231)]

[6] Hayawardh Vijayakumar and Joshua Schiffman and Trent Jaeger, **STING: Finding Name Resolution Vulnerabilities in Programs,** *In Proceedings of the 21st USENIX Security Symposium (USENIX Security 2012)*, [acceptance rate: 19.4% (43/222)]

[7] Joshua Schiffman and **Hayawardh Vijayakumar** and Trent Jaeger, **Verifying System Integrity by Proxy**, *In Proceedings of the 5th International Conference on Trust and Trustworthy Computing (TRUST 2012)*

[8] Hayawardh Vijayakumar and Guruprasad Jakka and Sandra Rueda and Joshua Schiffman and Trent Jaeger, Integrity Walls: **Finding Attack Surfaces from Mandatory Access Control Policies.**, *In Proceedings of the 7th ACM Symposium on Information, Computer, and Communications Security (ASIACCS 2012)* [acceptance rate: 22% (35/159)]

[9] Hayawardh Vijayakumar and Joshua Schiffman and Trent Jaeger, **A Rose by Any Other Name or an Insane Root? Adventures in Name Resolution**, *In Proceedings of 7th European Conference on Computer Network Defense (EC2ND 2011)*.

[10] Joshua Schiffman and Thomas Moyer and **Hayawardh Vijayakumar** and Trent Jaeger and Patrick McDaniel, Seeding Clouds with Trust Anchors, *In Proceedings of the 2010 ACM Workshop on Cloud Computing Security (CCSW 2010)*

[11] Divya Muthukumaran and Sandra Rueda and **Hayawardh Vijayakumar** and Trent Jaeger, **Cut Me Some Security,** *In Proceedings of the 3rd ACM Workshop on Assurable and Usable Security Configuration (SAFECONFIG 2010)*

[12] Sandra Rueda and **Hayawardh Vijayakumar** and Trent Jaeger, Analysis of Virtual Machine System Policies, In Proceedings of the 14th ACM Symposium on Access Control Models and Technologies (SACMAT 2009), [acceptance rate: 32% (24/75)]

[13] Thanukrishnan Srinivasan and R. Balakrishnan and S. A. Gangadharan and **Hayawardh Vijayakumar**, **A Scalable Parallelization of All-Pairs Shortest Path Algorithm for a High Performance Cluster Environment,** *In Proceedings of the 13th IEEE International Conference on Parallel and Distributed Systems (ICPADS 2007)*

[14] Thanukrishnan Srinivasan and R. Balakrishnan and S. A. Gangadharan and **Hayawardh Vijayakumar**, **Supervised Grid-of-Tries: A Novel Framework for Classifier Management,** *In Proceedings of the 8th International Conference on Distributed Computing and Networking (ICDCN 2006),* [acceptance rate: 25.3% (62/245)]