

Andrew Henderson

Cicero, NY

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TECHNICAL SKILLS

Software Skills: Expert in C/C++, GDB/JTAG debugging, highly proficient in reverse engineering and malware analysis, Agile development methodology.

Tools: GCC/GDB/Binutils, Git, Jira, Bitbucket, Confluence, Atmel Studio, Visual Studio, KiCad EDA.

Linux Development Areas: Kernel optimization (size/performance/boot time) for x86/ARM, kernel drivers/device tree development, Yocto, QEMU/KVM, U-Boot, POSIX userspace middleware/daemons/services development, AJAX/JSON/Node.js.

EXPERIENCE

System Architect, SW Lead **August 2020 to Present**

Intern SW Manager (~15 reports) **August 2020 to May 2021**

Senior Software Engineer **June 2017 to May 2021**

INFICON, Inc. (East Syracuse, NY)

- Create complete Yocto-based embedded Linux systems: kernel, custom device drivers, bootloader, file system, POSIX userspace applications.
- Develop Linux kernel device drivers for custom hardware (SPI, I2C, MMIO).
- Design/develop custom firmware for ARM/MIPS-based microcontrollers.
- Customize vendor BSPs for platform evaluation and prototype development.
- Serve as Agile Scrum Master for multiple projects as needed.
- Coordinate directly with customers to manage expectations and provide a technical communication channel.

Principal Investigator

December 2014 to June 2017

Research Scientist

December 2012 to December 2014

Intelligent Automation, Inc., Networks and Security Division (Rome, NY)

- Researched and authored proposals for over three million USD in ITAR-restricted SBIR and BAA program funding (US Air Force, Army, Navy).
- Acted as principal investigator on programs developing custom security hypervisors for Linux virtual machine introspection.
- Customized secure microkernels to improve their resistance to malware.
- Co-inventor for US Patent #10019576: "Security control system for protection of multi-core processors".

Independent Consultant

May 2011 to Present

Consulted with clients on-site and remotely (California, Florida, Illinois, New York)

- Authored proposals, requirement/design specifications, schedules, and budgets.
- Designed and developed custom embedded Linux and Android systems: kernel, custom device drivers, bootloader, file system, POSIX userspace applications.
- Reviewed and revised customer schematics and PCB layouts.
- Previous clients include:
 - Chicago Gaming: <https://www.chicago-gaming.com>
 - Epic Games: <https://www.epicgames.com>
 - Integrated Medical Devices: <http://www.integrated-medical.com>
 - Byte Technology: <https://bytetechnology.co>
 - Siemens Industry: <https://www.siemens.com>

Senior Software Engineer

May 2008 to August 2011

Amcom Software (Jacksonville, FL)

- Designed and developed C++ Win32 distributed middleware software products for medical equipment and nursecall system integration.
- Developed userspace C/C++ POSIX software for custom embedded Linux appliances for nursecall system integration.
- Engineering point-of-contact for field engineers resolving customer issues.

Product Development Manager (~10 reports) August 2003 to May 2008
eFlyte, Inc./DTI Software (Jacksonville, FL/Montreal, QC)

- Principal software engineer for multimedia software targeting embedded Linux systems (inflight entertainment market).
- Managed the complete product lifecycle and porting of over 30 Win32-based casual games to embedded Linux.
- Technical manager of all product development and QA staff.
- Technical liaison to numerous licensor partners: PopCap Games, MumboJumbo, Sprout Games, and Firelight Technologies Pty.
- Technical liaison to numerous licensee partners: Panasonic Avionics Corporation, Thales Avionics, and Singapore Airlines.

Interactive Applications Engineer April 2002 to August 2003
Panasonic Avionics Corporation (Lake Forest, CA)

- Developed C/C++ applications for Linux-based embedded systems (inflight entertainment systems).
- Served as engineering advisor for marketing and product development staff.
- Reverse-engineered Linux binaries, kernel driver modules, and libraries.

Software Engineer February 2000 to April 2002
Multiple Linux-Based Start-Up Companies (Orange County, CA)

- Ported a variety of multimedia Windows-based C++ applications to Linux.
- Developed Linux kernel drivers for custom PCI-based telephony hardware.
- Developed firmware for projects in the point-of-sale and set-top box markets.
- **More detailed company and technical role information available upon request.**

Engineering Leadership Development Program May 1999 to January 2000
Lockheed Martin Information Systems (Orlando, FL)

- Developed Linux kernel video drivers for embedded LCD display systems.
- Performed requirements analysis and COTS upgrade decisions pertaining to project hardware entering end-of-life.
- Received formal training for future transition to technical management.

**OPEN SOURCE
SERVICE AND
DEVELOPMENT**

- **Google Summer of Code** mentor for *BeagleBoard.org* (2015-2020).
- **GitHub Account** (<https://github.com/hendersa>): Personal repository of developed open source software and hardware.
- **BBBAndroid** (<http://bbbandroid.org>): Complete Android distribution with dynamic device tree overlay support for the BeagleBone Black ARM platform.
- **DECAF** (<https://github.com/decaf-project/DECAF>): Dynamic Executable Code Analysis Framework for malware analysis and introspection.
- **Beagle Entertainment System** (<https://beaglesnes.org>): Complete multimedia embedded Linux appliance implementation (kernel, device drivers, boot-loader, filesystem, userspace applications) for a retrogaming console on the BeagleBone Black ARM platform.

EDUCATION

PhD, Electrical and Computer Engineering

Research Areas: Cybersecurity, malware analysis, whole-system emulation

Dissertation: Selective dynamic analysis of virtualized whole-system environments
Syracuse University, Syracuse, NY, 2016

MBA, Business Administration

Jacksonville University, Jacksonville, FL, 2004

BS, Computer Science, Minor in Space Studies

Embry-Riddle Aeronautical University, Daytona Beach, FL, 1999

LIST OF PUBLICATIONS

BOOKS

- **A. Henderson**, A. Prakash. (2015). Android Hardware Interfacing with the BeagleBone Black. Birmingham, UK: Packt Publishing. ISBN 978-1784392161.

PATENTS

- G. Jin, H. Deng, B. J. Knapp, **A. Henderson**, J. Tuttle, R. Levy (2018). Security control system for protection of multi-core processors. U.S. Patent No. 10,019,576. Washington, DC: U.S. Patent and Trademark Office.

PUBLISHED RESEARCH WORK

- X. Hu, Y. Cheng, Y. Duan, **A. Henderson**, H. Yin. JSForce: A Forced Execution Engine for Malicious JavaScript Detection. International Conference on Security and Privacy in Communication Networks (SecureComm '17), October 2017.
- **A. Henderson**, H. Yin, G. Jin, H. Han, and H. Deng. VDF: Targeted Evolutionary Fuzz Testing of Virtual Devices. In Research in Attacks, Intrusions, and Defenses (RAID), September 2017.
- Q. Feng, M. Wang, M. Zhang, R. Zhou, **A. Henderson**, H. Yin. Extracting Conditional Formulas for Cross-Platform Bug Search. Proceedings of the 2017 ACM on Asia Conference on Computer and Communications Security, April 2017.
- **A. Henderson**, L. K. Yan, X. Hu, A. Prakash, H. Yin, and S. McCamant. (2016). DECAF: A Platform-Neutral Whole-System Dynamic Binary Analysis Platform. IEEE Transactions on Software Engineering 43 (2), 164-184.
- **A. Henderson**. Selective dynamic analysis of virtualized whole-system guest environments. Doctoral thesis, Syracuse University, 2016.
- **A. Henderson**, A. Prakash, L. K. Yan, X. Hu, X. Wang, R. Zhou, and H. Yin. Make it work, make it right, make it fast: building a platform-neutral whole-system dynamic binary analysis platform. Proceedings of the International Symposium on Software Testing and Analysis (ISSTA'14), San Jose, CA, July 2014.
- L. K. Yan, **A. Henderson**, X. Hu, H. Yin, and S. McCamant. On soundness and precision of dynamic taint analysis. Technical Report SYR-EECS-2014-04, Syracuse University, January 2014.
- N. Waytowich, **A. Henderson**, D. Krusienski, and D. Cox (2010, September). Robot application of a brain computer interface to Staubli TX40 robots-early stages. In World Automation Congress (WAC), 2010 (pp. 1-6). IEEE.
- **A. Henderson** (2010, May). A design for a middleware communications layer between an industrial robotic arm and the BCI2000 software package. In Proceedings of the Florida Conference on Recent Advances in Robotics (FCRAR).

MAGAZINE ARTICLES

- **A. Henderson** (2020, March). Real-time twitch gaming. HackSpace Magazine, 104-109.
- **A. Henderson** (2015, January). BeagleBone Black: Capes verwalten. Raspberry Pi Geek.
- **A. Henderson** (2014, April). Patrulha do código. Linux Magazine, 60-64.
- **A. Henderson** (2014, March). Bred in the Bone: BeagleBone capes. Raspberry Pi Geek, 64-68.
- **A. Henderson** (2013, December). Beagle Music: HDMI and the BeagleBone Black multimedia environment. Raspberry Pi Geek, 20-24.
- **A. Henderson** (2013, December). SecurityCode-Kontrolle: Malware analysieren und bekämpfen. Admin: IT-Praxis & Strategie, 78-91.
- **A. Henderson** (2013, October). Code Patrol: Fighting malware with static and dynamic code analysis. Linux Magazine, 16-19.