

W. Michael Petullo

Free and open source programmer, researcher, and teacher



I have followed in the footsteps of the pioneers of the free and open source software communities since 1999, making humble contributions to the progress of our software base. The outcomes of my work exist at <http://www.flyn.org/> in the form of a number of software packages, research findings, and technical documentation. Through this all, I have had the pleasure of leading and contributing to teams which span academia, free and open source software development, and military service.

Education

2013	Doctor of Philosophy in Computer Science, University of Illinois at Chicago
2005	Master of Science in Computer Science, DePaul University
1999	Bachelor of Science in Computer Science, Drake University

Teaching Assignments

2016–2017	USMA CS481, Operating Systems USMA CS401, Software Systems Design USMA XE402, Integrative Systems Design USMA CS474, Fundamentals of Computer Theory USMA CS482, Cyber Security Engineering
2015–2016	USMA CS481, Operating Systems USMA CS401, Software Systems Design USMA XE402, Integrative Systems Design USMA CS301, Fundamentals of Computer Science USMA CS482, Cyber Security Engineering
2014–2015	USMA CS481, Operating Systems USMA CS482, Cyber Security Engineering
2013–2014	USMA CS481, Operating Systems USMA IT305, Theory and Practice of Military Information Systems

Refereed Publications

- O'Connor, T.J., William Enck, W. Michael Petullo, and Akash Verma. "PIVOTWALL: SDN-Based Information Flow Control". In: *Proceedings of the Symposium on SDN Research*. SOSR '18. Los Angeles, CA, USA: ACM, Mar. 2018.
- Shockley, Matt, Chris Maixner, Ryan Johnson, Mitch DeRidder, et al. "Using VISORFLOW to Control Information Flow without Modifying the Operating System Kernel or its Userspace". In: *Proceedings of the 9th ACM CCS International Workshop on Managing Insider Security Threats*. MIST '17. Dallas, Texas, USA: ACM, Oct. 2017. URL: <http://www.flyn.org/publications/2017-VisorFlow.pdf>.
- Johnson, Ryan, Jessie Lass, and W. Michael Petullo. "Studying Naïve Users and the Insider Threat with SIMPLEFLOW". In: *Proceedings of the 8th ACM CCS International Workshop on Managing Insider Security Threats*. MIST '16. Vienna, Austria: ACM, Oct. 2016, pp. 35–46. URL: <http://www.flyn.org/publications/2016-SimpleFlow.pdf>.
- Petullo, W. Michael, Kyle Moses, Ben Klimkowski, Ryan Hand, et al. "The Use of Cyber-Defense Exercises in Undergraduate Computing Education". In: *Proceedings of the 2016 USENIX Workshop on Advances in Security Education*. ASE '16. Austin, Texas, USA: USENIX Association, Aug. 2016. URL: <http://www.flyn.org/publications/2016-CDX.pdf>.

Refereed Publications (continued)

- Petullo, W. Michael and Joseph Suh. "On the Generality and Convenience of Etypes". In: *Proceedings of the 2015 IEEE Security and Privacy Workshops*. San Jose, California, USA: IEEE, May 2015. URL: <http://www.flyn.org/publications/2015-Etypes-Generality.pdf>.
- St. Amour, Leo and W. Michael Petullo. "Improving Application Security Through TLS-Library Redesign". In: *Proceedings of the Fifth International Conference on Security, Privacy, and Applied Cryptography Engineering*. Ed. by Peter Schwabe, Jon Solworth, and Rajat Subhra. (30% acceptance rate). Jaipur, Rajasthan, India: Springer, Oct. 2015. URL: <http://www.flyn.org/publications/2015-libtlssep.pdf>.
- Moses, Kyle V. and W. Michael Petullo. "Teaching Computer Security". In: *Proceedings of the ASEE Middle Atlantic Section Meeting*. ASEE MidAtlantic '14. Swarthmore, Pennsylvania, USA: ASEE, Nov. 2014. URL: <http://www.flyn.org/publications/2014-Teaching-Computer-Security.pdf>.
- Petullo, W. Michael, Jon A. Solworth, Wenyuan Fei, and Pat Gavlin. "Ethos' Deeply Integrated Distributed Types". In: *Proceedings of the 2014 IEEE Security and Privacy Workshops*. San Jose, California, USA: IEEE, May 2014. URL: <http://www.flyn.org/publications/2014-Ethos-Types.pdf>.
- Petullo, W. Michael and Jon A. Solworth. "Simple-to-use, Secure-by-design Networking in Ethos". In: *Proceedings of the 6th European Workshop on System Security*. EUROSEC '13. (30% acceptance rate). Prague, Czech Republic: ACM, Apr. 2013. URL: <http://www.flyn.org/publications/2013-Simple-Secure-Networking.pdf>.
- Petullo, W. Michael, Xu Zhang, Jon A. Solworth, Daniel J. Bernstein, et al. "MINIMALT: Minimal-latency Networking Through Better Security". In: *Proceedings of the 2013 ACM SIGSAC Conference on Computer and Communications Security*. CCS '13. (20% acceptance rate). Berlin, Germany: ACM, Nov. 2013. URL: <http://www.flyn.org/publications/2013-MinimalT.pdf>.
- Petullo, W. Michael and Jon A. Solworth. "Digital identity security architecture in Ethos". In: *Proceedings of the 7th ACM workshop on Digital Identity Management*. DIM '11. (45% acceptance rate). Chicago, Illinois, USA: ACM, Oct. 2011, pp. 23–30. ISBN: 978-1-4503-1006-2. URL: <http://www.flyn.org/publications/2011-Ethos-Identity.pdf>.

Ph.D. Dissertation

- Petullo, W. Michael. "Rethinking Operating System Interfaces to Support Robust Network Applications". PhD thesis. Chicago, IL, USA: University of Illinois at Chicago, May 2013. URL: <http://www.flyn.org/publications/2013-Petullo-Dissertation.pdf>.

Free and Open Source Programming

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| 2018–Present | Designed, built, and presently maintain Aquinas, an interactive learning system that aims to teach computer programming and exploit development. Deployed at http://www.aquinas.dev . |
| 2016–2017 | Implemented with four students VISORFLOW, a tool that uses VM introspection to impose a simple, information-flow based access control model on guests running Linux or Windows. VISORFLOW neither requires notable modifications to the guest operating system nor depends on specialized applications. |
| 2015–2016 | Implemented with two students SIMPLEFLOW, a modification to the Linux kernel that uses the Linux Security Module interface to implement a simple, information-flow based access control model. |
| 2010–Present | Contributor to the Ethos research operating system project, including contributions to both the kernel and its userspace. Also one of the lead designers and implementors of the MINIMALT network protocol. These were the subjects of my Ph.D. dissertation. |
| 2010–Present | Serve as an OpenWrt contributor; I presently maintain 32 packages. |
| 2008–Present | Maintain libdmapsharing and dmapd which implement Apple's iTunes and iPhoto media-sharing protocols. |
| 2008 | Added support to GRUB for encrypted boot partitions. |
| 2005 | Implemented support for removable, encrypted disks on Fedora and Red Hat Enterprise Linux. |
| 2004 | Wrote pam-keyring, which was eventually integrated into GNOME's gnome-keyring. |
| 2003–Present | Serve as a Fedora Project contributor; I presently maintain seven packages. |

Free and Open Source Programming (continued)

- 1999–Present Submitted over 60 source patches to a wide range of open source projects.
- 1999–Present Publish Flynn Computing, a project I started in 1999 to provide custom software solutions based on free and open source software. Located at <http://www.flynn.org>.

Invited Talks and Presentations

- Petullo, W. Michael and Jon A. Solworth. “Simple-to-use, Secure-by-design Networking in Ethos”. Presentation at the 3rd ACM workshop on Runtime Environments, Systems, Layering and Virtualized Environments. Houston, Texas, USA, Mar. 2013.
- “The Lazy Kernel Hacker and Application Programmer”. Presentation at the 3rd ACM workshop on Runtime Environments, Systems, Layering and Virtualized Environments. Houston, Texas, USA, Mar. 2013.
- Petullo, W. Michael. *Let’s Help Johnny Write Robust Applications*. Invited talk, December 3, University of Wisconsin–Madison. 2012.

Magazine Articles

- Petullo, W. Michael. “Building custom firmware with OpenWrt”. In: *Linux Journal* 2010.196 (Aug. 2010). Belltown Media, pp. 56–61. ISSN: 1075-3583. URL: <http://www.linuxjournal.com/article/10687>.
- “From camera to website: Building an open source video streamer”. In: *Red Hat Magazine* (Apr. 2008). URL: <http://magazine.redhat.com/2008/04/24/from-camera-to-website-building-an-open-source-video-streamer/>.
- “Open source telephony: a Fedora-based VoIP server with Asterisk”. In: *Red Hat Magazine* (July 2008). URL: <http://magazine.redhat.com/2008/07/24/open-source-telephony-a-fedora-based-voip-server-with-asterisk/>.
- “Serving Apples: Integrating Mac OS X clients into a Fedora network”. In: *Red Hat Magazine* (Jan. 2008). URL: <http://magazine.redhat.com/2008/01/17/serving-apples-integrating-mac-os-x-clients-into-a-fedora-network/>.
- “Disk encryption in Fedora: Past, present and future”. In: *Red Hat Magazine* (Jan. 2007). URL: <http://magazine.redhat.com/2007/01/18/disk-encryption-in-fedora-past-present-and-future/>.
- “Adding encryption support to HAL: A user’s experience with Fedora development”. In: *Red Hat Magazine* (Oct. 2005). URL: <http://www.redhat.com/magazine/012oct05/features/hal/>.
- “Developing GNOME applications with Java”. In: *Linux Journal* 2005.135 (July 2005). Belltown Media, pp. 72–78. ISSN: 1075-3583. URL: <http://www.linuxjournal.com/article/8111>.
- “Encrypt your root filesystem”. In: *Linux Journal* 2005.129 (Jan. 2005). Belltown Media. ISSN: 1075-3583. URL: <http://www.linuxjournal.com/article/7743>.
- “Implementing encrypted home directories”. In: *Linux Journal* 2003.112 (Aug. 2003). Belltown Media. ISSN: 1075-3583. URL: <http://www.linuxjournal.com/article/6481>.
- “Amateur Video Production Using Free Software and Linux”. In: *Linux Journal* (May 2002). Belltown Media. URL: <http://www.linuxjournal.com/article/5817>.

Grants Awarded

- 2015 National Science Foundation CRII: SaTC: Next-Generation Robust Software (\$30,234)

Committees and Panels

- 2017 Program Committee, Ninth ACM CCS International Workshop on Managing Insider Security Threats
- 2015 Program Committee, Fifth International Conference on Security, Privacy, and Applied Cryptography Engineering
National Science Foundation Secure and Trustworthy Cyberspace

Honors Theses Advised

- 2017 Guestrace: System-Wide Syscall Monitoring, Matt Shockley, USMA
Using VISORFLOW to Mediate Linux, Chris Maixner, USMA
VISORFLOW's Network Integration, Mitch DeRidder, USMA
- 2016 SIMPLEFLOW: An Information-Flow-Based Security Model, Jessie Lass, USMA
Don't Let the Evil Out: Putting the Evil Bit to Use, Ryan Johnson, USMA
CentOS Hardening for the Cyber Defense Exercise, Blaze Bissar, USMA
- 2015 Improving Application Security Through TLS-Library Redesign, Leo St. Amour, USMA
Chat Concurrency with an Eye to Security, Luke Miller, USMA

Academic Service and Professional Activities

- 2014–2017 Head Coach, United States Military Academy Cyber Defense Exercise Team. Our team won the 2016 competition against our fellow United States Service Academies and the Royal Military College of Canada.
- 2014–2016 Deputy Program Director, United States Military Academy Computer Science Program.
- 2014–2016 Steering Committee Member, United States Military Academy Computer Science Program.
- 2013–2016 Faculty Advisor, United States Military Academy Chapter of YIIE.
- 2011–2012 Coordinator for a weekly seminar at the University of Illinois at Chicago covering advanced topics in programming (average attendance was 35 students).
- 2010 Mentor, Google Summer of Code; my student added DACP remote-control support to libdmapsharing.
- 2005–Present Member, YIIE, the International Honor Society for the Computing and Information Disciplines.

Student Development

- 2016–2017 Honors-thesis advisor of three students.
- 2015–2016 Honors-thesis advisor of three students.
- 2014–2015 Honors-thesis advisor of two students.
- 2013–2017 Department academic counselor of nine students; all nine students graduated in 2017.

Recent Experience

- 2017–Present Presently serving as the Director and Lead Developer of the US Army's Cyber Solutions Development Detachment. We consist of over 100 developers, and we provide custom software and hardware products to the Cyber Mission Force and other Army and Joint customers.
- 2013–2017 Served as an Assistant Professor within the Electrical Engineering and Computer Science Department at the US Military Academy.
- 2010–2013 Selected for advanced civil schooling. My Ph.D. dissertation is titled "Rethinking Operating System Interfaces to Support Robust Network Applications."

Recent Experience (continued)

2007–2010

Served as the Communications Officer and Signal Center Director for 3rd Battalion, 3rd Special Forces Group. During Operation Enduring Freedom XI, I was responsible for the planning and installation of all IP networks (LAN and TDMA/VSAT/WAN), IT systems, and combat network radio base stations (VHF, single-channel tactical satellite, and HF) in support of a 300-man Special Operations Task Force conducting combat operations in Regional Command–East, Afghanistan. During Operation Enduring Freedom XV, served as the Chief of Operations for Special Operations Task Force–East, Afghanistan.