

# **2017 IEEE Security and Privacy Workshops (SPW 2017)**

**San Jose, California, USA  
25 May 2017**



**IEEE Catalog Number: CFP17SPX-POD  
ISBN: 978-1-5386-1969-8**

**Copyright © 2017 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP17SPX-POD
ISBN (Print-On-Demand):	978-1-5386-1969-8
ISBN (Online):	978-1-5386-1968-1

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2017 IEEE Symposium on Security and Privacy Workshops

## SPW 2017

### Table of Contents

Message from the SPW 2017 General Chair.....	ix
Introduction to IWPE.....	xi
Summary from the IWPE 2017 Chairs.....	xii
IWPE Committees.....	xiv
Introduction to BioStar.....	xvi
BioStar Committees.....	xvii
Introduction to LangSec.....	xviii
LangSec Committees.....	xix
Introduction to MoST.....	xx
MoSt Committees.....	xxi
Introduction to ConPro.....	xxii
ConPro Committees.....	xxiii
Introduction to WTMC.....	xxiv
WTMC Committees.....	xxv

---

### **BioStar: Workshop on Bio-inspired Security, Trust, Assurance and Resilience**

On the Personalization of Trust Management .....	1
<i>Hisham Salah and Mohamed Eltoweissy</i>	
Guiding a Colony of Black-Box Fuzzers with Chemotaxis .....	11
<i>Konstantin Böttinger</i>	
Ant Colony-Inspired Parallel Algorithm to Improve Cryptographic Pseudo Random Number Generators .....	17
<i>Jörg Keller, Gabriele Spenger, and Steffen Wendzel</i>	
Evolutionary Approaches for Resilient Surveillance Management .....	23
<i>Ruidan Li and Errin W. Fulp</i>	

Don't You Touch My Nuts: Information Hiding in Cyber Physical Systems .....	29
<i>Steffen Wendzel, Wojciech Mazurczyk, and Georg Haas</i>	
Using Evolutionary Diversity to Identify Problematic Software Parameters .....	35
<i>Errin W. Fulp, H. Donald Gage, and Matthew R. McNiece</i>	
Attack-Resistant aiCAPTCHA Using a Negative Selection Artificial Immune System .....	41
<i>Brian M. Powell, Ekampreet Kalsy, Gaurav Goswami, Mayank Vatsa, Richa Singh, and Afzel Noore</i>	
Biometric Authentication Using Mouse and Eye Movement Data .....	47
<i>Jamison Rose, Yudong Liu, and Ahmed Awad</i>	
Towards a Biometric Authentication-Based Hybrid Trust-Computing Approach for Verification of Provider Profiles in Online Healthcare Information .....	56
<i>Ankur Chattopadhyay, Michael J. Schulz, Clinton Rettler, Katie Turkiewicz, Laleah Fernandez, and Askar Ziganshin</i>	
 <b>LangSec: Fourth Workshop on Language Theoretic Security</b>	
Taming the Length Field in Binary Data: Calc-Regular Languages .....	66
<i>Stefan Lucks, Norina Marie Grosch, and Joshua König</i>	
Writing Parsers Like it is 2017 .....	80
<i>Pierre Chifflier and Geoffroy Couprie</i>	
Eliminating Input-Based Attacks by Deriving Automated Encoders and Decoders from Context-Free Grammars .....	93
<i>Tobias Bieschke, Lars Hermerschmidt, Bernhard Rumpe, and Peter Stanchev</i>	
Inference of Security-Sensitive Entities in Libraries .....	102
<i>Yi Lu, Sora Bae, Padmanabhan Krishnan, and K. R. Raghavendra</i>	
A Framework for Validating Session Protocols .....	110
<i>Kit Sum Tse and Peter C. Johnson</i>	
Building Hardened Internet-of-Things Clients with Language-Theoretic Security .....	120
<i>Prashant Anantharaman, Michael Locasto, Gabriela F. Ciocarlie, and Ulf Lindqvist</i>	
Research Report: Hardware-Enforcement of Walther-Recursive Program Functions .....	127
<i>Jacob I. Torrey, Mark P. Bridgman, and Tomasz Tuzel</i>	
Lua Code: Security Overview and Practical Approaches to Static Analysis .....	132
<i>Andrei Costin</i>	
IDE Plugins for Detecting Input-Validation Vulnerabilities .....	143
<i>Aniqua Z. Baset and Tamara Denning</i>	

## **MoST: Mobile Security Technologies**

HybridGuard: A Principal-Based Permission and Fine-Grained Policy Enforcement Framework for Web-Based Mobile Applications .....	147
<i>Phu H. Phung, Abhinav Mohanty, Rahul Rachapalli, and Meera Sridhar</i>	
Spartan Jester: End-to-End Information Flow Control for Hybrid Android Applications .....	157
<i>Julian Sexton, Andrey Chudnov, and David A. Naumann</i>	
Seamless In-App Ad Blocking on Stock Android .....	163
<i>Michael Backes, Sven Bugiel, Philipp von Styp-Rekowsky, and Marvin Wißfeld</i>	
Mobile Subscriber WiFi Privacy .....	169
<i>Piers O’Hanlon, Ravishankar Borgaonkar, and Lucca Hirschi</i>	
The Applicability of Ambient Sensors as Proximity Evidence for NFC Transactions .....	179
<i>Carlton Shepherd, Iakovos Gurulian, Eibe Frank, Konstantinos Markantonakis, Raja Naeem Akram, Emmanouil Panaousis, and Keith Mayes</i>	
MR-Droid: A Scalable and Prioritized Analysis of Inter-App Communication Risks .....	189
<i>Fang Liu, Haipeng Cai, Gang Wang, Danfeng (Daphne) Yao, Karim O. Elish, and Barbara G. Ryder</i>	

## **WTMC: Second Workshop on Traffic Measurements for Cybersecurity**

Security Implications of Publicly Reachable Building Automation Systems .....	199
<i>Oliver Gasser, Quirin Scheitle, Carl Denis, Nadja Schrickler, and Georg Carle</i>	
Malware Detection by Analysing Network Traffic with Neural Networks .....	205
<i>Paul Prasse, Lukáš Machlica, Tomáš Pevný, Jiří Havelka, and Tobias Scheffer</i>	
Scalable Secure Multi-party Network Vulnerability Analysis via Symbolic Optimization .....	211
<i>Kinan Dak Albab, Rawane Issa, Andrei Lapets, Azer Bestavros, and Nikolaj Volgushev</i>	
An Investigation of Power Law Probability Distributions for Network Anomaly Detection .....	217
<i>Stefan Prandl, Mihai Lazarescu, Duc Son Pham, Sie Teng Soh, and Subhash Kak</i>	
Real Time Network File Similarity Detection Based on Approximate Matching .....	223
<i>Aonan Zhai, Fei Xu, Zigang Cao, Haiqing Pan, Zhen Li, and Gang Xiong</i>	
Using Gaussian Mixture Models to Detect Outliers in Seasonal Univariate Network Traffic .....	229
<i>Aarthi Reddy, Meredith Ordway-West, Melissa Lee, Matt Dugan, Joshua Whitney, Ronen Kahana, Brad Ford, Johan Muedsam, Austin Henslee, and Max Rao</i>	
Effects of Shared Bandwidth on Anonymity of the I2P Network Users .....	235
<i>Khalid Shahbar and A. Nur Zincir-Heywood</i>	

Traffic Monitoring and Diagnosis with Multivariate Statistical Network Monitoring: A Case Study .....	241
<i>José Camacho, Pedro García-Teodoro, and Gabriel Maciá-Fernández</i>	
Ethics and Internet Measurements .....	247
<i>Jeroen van der Ham</i>	
<b>Author Index</b> .....	<b>252</b>