

2016 IEEE Conference on Intelligence and Security Informatics (ISI 2016)

**Tucson, Arizona, USA
28-30 September 2016**



IEEE Catalog Number: CFP16ITI-POD
ISBN: 978-1-5090-3866-4

**Copyright © 2016 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 publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP16ITI-POD
ISBN (Print-On-Demand):	978-1-5090-3866-4
ISBN (Online):	978-1-5090-3865-7

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TECHNICAL PAPERS

Part I: Long Papers

Cybersecurity Analytics and Threat Intelligence

Rights Management to Enable a True Internet of Things	1
<i>Robert Newman, Pat Doody, Mira Trebar, Uchenna Okeke</i>	
Darknet and Deepnet Mining for Proactive Cybersecurity Threat Intelligence	7
<i>Eric Nunes, Ahmad Diab, Andrew Gunn, Ericsson Marin, Vineet Mishra, Vivin Paliath, John Robertson, Jana Shakarian, Amanda Thart, Paulo Shakarian</i>	
Exploring Key Hackers and Cybersecurity Threats in Chinese Hacker Communities	13
<i>Zhen Fang, Xinyi Zhao, Qiang Wei, Guoqing Chen, Yong Zhang, Chunxiao Xing, Weifeng Li, Hsinchun Chen</i>	
AZSecure Hacker Assets Portal: Cyber Threat Intelligence and Malware Analysis	19
<i>Sagar Samtani, Kory Chinn, Cathy Larson, Hsinchun Chen</i>	
Identifying SCADA Vulnerabilities Using Passive and Active Vulnerability Assessment Techniques	25
<i>Sagar Samtani, Shuo Yu, Hongyi Zhu, Mark Patton, Hsinchun Chen</i>	
PhishMonger: A Free and Open Source Public Archive of Real-World Phishing Websites	31
<i>David G. Dobolyi, Ahmed Abbasi</i>	
Using Cyber Defense Exercises to Obtain Additional Data for Attacker Profiling	37
<i>Joel Brynielsson, Ulrik Franke, Muhammad Adnan Tariq, Stefan Varga</i>	
Mining Hospital Data Breach Records: Cyber Threats to U.S. Hospitals	43
<i>Travis Floyd, Matthew Grieco, Edna F. Reid</i>	
Data Science and Analytics in Security Informatics	
Bayesian Nonparametric Relational Learning with the Broken Tree Process	49
<i>Justin Sahs</i>	
Activating Topic Models from a Cognitive Perspective	55
<i>Jie Bai, Linjing Li, Daniel Zeng</i>	
Meme Extraction and Tracing in Crisis Events	61
<i>Saike He, Xiaolong Zheng, Jiaojiao Wang, Zhijun Chang, Yin Luo, Daniel Zeng</i>	
Predictability of NetFlow Data	67
<i>Marina Evangelou, Niall M. Adams</i>	
Effective Prioritization of Network Intrusion Alerts to Enhance Situational Awareness	73
<i>E. Allison Newcomb, Robert J. Hammell II, Steve Hutchinson</i>	

Identifying Features for Detecting Fraudulent Loan Requests on P2P Platforms	79
<i>Jennifer Xu, Dongyu Chen, Michael Chau</i>	
Measuring Online Affects in a White Supremacy Forum	85
<i>Léo Figea, Lisa Kaati, Ryan Scrivens</i>	
Model-Based Clustering and New Edge Modelling in Large Computer Networks	91
<i>Silvia Metelli, Nicholas Heard</i>	
Chinese Underground Market Jargon Analysis Based on Unsupervised Learning	97
<i>Kangzhi Zhao, Yong Zhang, Chunxiao Xing, Weifeng Li, Hsinchun Chen</i>	
Automated Big Text Security Classification	103
<i>Khudran Alzhrani, Ethan M. Rudd, Terrance E. Boult, C. Edward Chow</i>	
Surfacing Collaborated Networks in Dark Web to Find Illicit and Criminal Content	109
<i>Ahmed T. Zulkarnine, Richard Frank, Bryan Monk, Julianna Mitchell, Garth Davies</i>	
Activity Monitoring Using Topic Models	115
<i>Boshra Nabaei, Martin Ester</i>	
Automatic Detection of Xenophobic Narratives: A Case Study on Swedish Alternative Media	121
<i>Lisa Kaati, Amendra Shrestha, Katie Cohen, Sinna Lindquist</i>	
Spatial-Temporal Patterns and Drivers of Illicit Tobacco Trade in Changsha County, China	127
<i>Jiaojiao Wang, Saike He, Yiyuan Xu, Zhidong Cao, Lei Wang, Daniel Dajun Zeng</i>	
A Non-Parametric Learning Approach to Identify Online Human Trafficking	133
<i>Hamidreza Alvani, Paulo Shakarian, J.E. Kelly Snyder</i>	
Near Real-time Atrocity Event Coding	139
<i>Mohiuddin Solaimani, Sayeed Salam, Ahmad M. Mustafa, Latifur Khan, Patrick T. Brandt, Bhavani Thuraisingham</i>	
Exploring the Online Underground Marketplaces through Topic-Based Social Network and Clustering	145
<i>Shin-Ying Huang, Hsinchun Chen</i>	
Discovering Structure in Islamist Postings Using Systemic Nets	151
<i>N. Alsadhan, D.B. Skillicorn</i>	
Social Media Account Linkage Using User-Generated Geo-Location Data	157
<i>Xiaohui Han, Lianhai Wang, Lijuan Xu, Shuihui Zhang</i>	
Human Behavior and Factors in Security Applications	
Trust and Distrust as Distinct Constructs: Evidence from Data Theft Environments	163
<i>Steven J. Simon</i>	
Phishing Susceptibility: The Good, the Bad, and the Ugly	169
<i>Ahmed Abbasi, F. Mariam Zahedi, Yan Chen</i>	

Organizational, National, and International Issues in Counter-Terrorism and Other Security Applications

Identifying the Socio-Spatial Dynamics of Terrorist Attacks in the Middle East	175
<i>Ze Li, Duoyong Sun, Hsinchun Chen, Shin-Ying Huang</i>	

The Impact of US Cyber Policies on Cyber-Attacks Trend	181
<i>Sumeet Kumar, Matthew Benigni, Kathleen M. Carley</i>	

Part II: Short Papers

Cybersecurity Analytics and Threat Intelligence

Product Offerings in Malicious Hacker Markets	187
<i>Ericsson Marin, Ahmad Diab, Paulo Shakarian</i>	

Topic Modelling of Authentication Events in an Enterprise Computer Network	190
<i>Nick Heard, Konstantina Palla, Maria Skoularidou</i>	

Shodan Visualized	193
<i>Vincent J. Ercolani, Mark W. Patton, Hsinchun Chen</i>	

SCADA Honeypots: An In-depth Analysis of Conpot	196
<i>Arthur Jicha, Mark Patton, Hsinchun Chen</i>	

Identifying Devices across the IPv4 Address Space	199
<i>Ryan Jicha, Mark W. Patton, Hsinchun Chen, Cathy Larson</i>	

Data Science and Analytics in Security Informatics

New Words Enlightened Sentiment Analysis in Social Media	202
<i>Chiyu Cai, Linjing Li, Daniel Zeng</i>	

Identifying Language Groups within Multilingual Cybercriminal Forums	205
<i>Victor Benjamin, Hsinchun Chen</i>	

Poisson Factorization for Peer-Based Anomaly Detection	208
<i>Melissa Turcotte, Juston Moore, Nick Heard, Aaron McPhall</i>	

Social Role Clustering with Topic Model	211
<i>Jie Bai, Linjing Li, Daniel Zeng, Junjie Lin</i>	

Competitive Perspective Identification via Topic Based Refinement for Online Documents	214
<i>Junjie Lin, Wenji Mao, Daniel Zeng</i>	

Part III: Poster Papers

Cybersecurity Analytics and Threat Intelligence

Anonymous Port Scanning: Performing Network Reconnaissance Through Tor	217
<i>Rodney Rohrmann, Mark W. Patton, Hsinchun Chen</i>	

DDoS Cyber-Attacks Network: Who's Attacking Whom	218
<i>Sumeet Kumar, Kathleen M. Carley</i>	

Data Science and Analytics in Security Informatics

Identifying Top Listers in Alphabay Using Latent Dirichlet Allocation	219
<i>John Grisham, Calvin Barreras, Cyrus Afarin, Mark Patton, Hsinchun Chen</i>	

Part IV: Workshop Papers

Big Data Analytics for Cybersecurity Computing

Network-Wide Anomaly Detection via the Dirichlet Process	220
<i>Nick Heard, Patrick Rubin-Delanchy</i>	

Parallel Massive Data Monitoring and Processing Using Sensor Networks	225
<i>Hamid Reza Naji, Najmeh Rezaee</i>	

Understanding DDoS Cyber-Attacks Using Social Media Analytics	231
<i>Sumeet Kumar, Kathleen M. Carley</i>	

IoT Security Development Framework for Building Trustworthy Smart Car Services	237
<i>Jesus Pacheco, Shalaka Satam, Salim Hariri, Clarisa Grijalva, Helena Berkenbrock</i>	

Disassortativity of Computer Networks	243
<i>Patrick Rubin-Delanchy, Niall M. Adams, Nicholas A. Heard</i>	

Activity-Based Temporal Anomaly Detection in Enterprise-Cyber Security	248
<i>Mark Whitehouse, Marina Evangelou, Niall M. Adams</i>	

Cybersecurity Education & Workforce

An Undergraduate Cyber Operations Curriculum in the Making: A 10⁺ Year Report	251
<i>Shiva Azadegan, Michael O'Leary</i>	

Engaging Females in Cybersecurity: K through Gray	255
<i>Xiang Liu, Diane Murphy</i>	

Using Eye-tracking to Investigate Content Skipping: A Study on Learning Modules in Cybersecurity	261
<i>Sagar Raina, Leon Bernard, Blair Taylor, Siddharth Kaza</i>	

Cybersecurity Workforce Development: A Peer Mentoring Approach	267
<i>Vandana P. Janeja, Carolyn Seaman, Kerrie Kephart, Aryya Gangopadhyay, Amy Everhart</i>	

Design and Implementation of a Multi-Facet Hierarchical Cybersecurity Education Framework	273
<i>Wei Wei, Arti Mann, Kewei Sha, T. Andrew Yang</i>	

Smart Augmented Reality Glasses in Cybersecurity and Forensic Education	279
<i>Nikitha Kommera, Faisal Kaleem, Syed Mubashir Shah Harooni</i>	

CySCom: CyberSecurity COMics	282
<i>Brian Ledbetter Jr., Zach Wallace, Adam Harms, Ambareen Siraj</i>	

Challenges, Lessons Learned and Results from Establishing a CyberCorps: Scholarship for Service Program Targeting Undergraduate Students	285
<i>Shiva Azadegan, Josh Dehlinger, Siddharth Kaza, Blair Taylor, Wei Yu</i>	

Women in Cybersecurity

Intruder Detector: A Continuous Authentication Tool to Model User Behavior	286
<i>Leslie C. Milton, Atif Memon</i>	

An Immune Inspired Unsupervised Intrusion Detection System for Detection of Novel Attacks	292
<i>Manjari Jha, Raj Acharya</i>	

Automatic Clustering of Malware Variants	298
<i>Rima Asmar Awad, Kirk D. Sayre</i>	

Doctoral Consortium

Soft Computing and Hybrid Intelligence for Decision Support in Forensics Science	304
<i>Andrii Shalaginov</i>	

Approaches to Understanding the Motivations Behind Cyber Attacks	307
<i>Sumeet Kumar, Kathleen M. Carley</i>	

Topic Modeling of Small Sequential Documents: Proposed Experiments for Detecting Terror Attacks	310
<i>Brandon W. Jones, Wingyan Chung</i>	

Detecting Radicalization Trajectories Using Graph Pattern Matching Algorithms	313
<i>Benjamin W.K. Hung, Anura P. Jayasumana, Vidarshana W. Bandara</i>	

Modeling Cyber-Attacks on Industrial Control Systems	316
<i>Vivin Paliath, Paulo Shakarian</i>	

Using Social Network Analysis to Identify Key Hackers for Keylogging Tools in Hacker Forums	319
<i>Sagar Samtani, Hsinchun Chen</i>	

Targeting Key Data Breach Services in Underground Supply Chain	322
<i>Weifeng Li, Junming Yin, Hsinchun Chen</i>	