



2011 IEEE Intl. Workshop on Information Forensics and Security

Foz do Iguaçu, Brazil, November 29th – December 2nd

Program

2011 IEEE International Workshop on Information Forensics and Security (WIFS)

Welcome Message from the Chairs

Information forensics is a rapidly evolving field that has grown considerably over the past few years, in large part due to significant advances in the underlying computing and communication infrastructure. These new communication and computing advancements have been both a boon and a bane, in the sense that it has made our world more intimately connected, allowing for significant societal improvements to take place across the world, but at the same time these advancements have also brought the dishonest elements of our society closer to us. For most of us, there is no longer a single day in which we don't get some form of illicit email promising cheap medicines, containing a suspicious attachment or having a link to some misspelled fake version of a bank's website.

Although technology has helped the adversarial elements of the world to become more powerful, it also holds the promise of fixing these new forms of attacks. Faster processors and memory caching bring us closer to deep packet inspection involving regular expression matching that can run at linear rates. Distributed collections of video cameras can collaboratively pinpoint suspicious people or activities, activate additional information gathering sensors, and ultimately advanced machine learning mechanisms can identify most probable causes for such anomalous events and, if warranted, trigger law enforcement or other agencies. Improvements in biometric systems are increasing the reliability of physical access control systems and ultimately offer the promise that we will no longer need to remember complicated passwords or, more importantly, assure that we no longer have to choose weak passwords so that we don't have to remember complicated ones.

It is an exciting time to be involved in research in information security and forensics since technology is rapidly advancing to meet the computational and communication requirements needed to solve challenges that were previously in the science fiction realm. The *IEEE International Workshop on Information Forensics and Security (WIFS)* has been a premier venue for researchers in information forensics and security to present the latest research results in the field, and has also served to foster international collaboration to address the security threats facing our society.

This year, the *2011 IEEE International Workshop on Information Forensics and Security* is being held at Foz do Iguacu, Brazil, and we are fortunate to have close partners in running and organizing this workshop. Among these partners are the Brazilian Association of Federal Police Forensic Experts (www.apcf.org.br) and the Brazilian Federal Police (www.dpf.gov.br).

Two tracks of 2011 WIFS will be dedicated to presentations from the forensic expert community in DPF. These presentations will cover case studies and technical open issues which are perceived as specially relevant for the solution of real life cases. It will be a great opportunity for both experts and researchers to exchange experience and make professional contacts. It is expected that the association between the IFS-TC community and forensic experts working directly in the prevention and solution of crimes will lead to greater visibility and application of state-of-the-art research results.

This year, we received an overwhelming submission number of 123 manuscripts, out of which 40 high-quality papers were selected for publication in the workshop proceedings after rigorous peer reviews. From a general perspective, the papers can be categorized in the following areas: *biometrics, computer and network security/forensics, multimedia security/forensics, signal processing for forensics, and theoretical foundations for forensics*. We have split the workshop into several tracks consisting of papers from these core areas, and have also included a poster session on Thursday, where we are encouraging researchers to share their work-in-progress. In addition to the research tracks, we are fortunate to have three keynote speakers:

- (1) Dr. Patrick Flynn (University of Notre Dame) who will present the talk *Iris Recognition: Challenges, Advances, and Generalizations*
- (2) Dr. William Horne (Hewlett-Packard Labs.) who will present the talk *Cloud Security: What's New?*
- (3) Dr. Ton Kalker (Huawei Technologies) who will present the talk *Watermarking: Quo Vadis?*

In addition, we also are holding four tutorials:

- (1) *Information Security from a Hardware Perspective: Challenges and Solutions* by Dr. Debdeep Mukhopadhyay and Dr. Rajat Subhra Chakraborty (IIT Kharagpur)
- (2) *Social Science and its Impact on Cyber Security* by Dr. Deanna D. Caputo (The Mitre Corporation)
- (3) *Multimedia Forensics* by Dr. Nasir Memon (NYU Poly)
- (4) *3-D Reconstruction tools and techniques for Forensics and Surveillance* by Dr. Eugene Liscio (AI2-3D)

As we mentioned earlier, this year we are also trying something new, and will be holding a WIFS Special Event – each day, a speaker from the Brazilian Federal Police will present a collection of important research challenge topics in forensics and security.

Finally, we would like to thank all of the authors who submitted their manuscripts to the workshop and the reviewers who provided valuable reviews in a timely manner. We also would like to thank APCF and DPF people as well as everyone in IFS-TC and outside the TC for their professional assistance in organizing the conference. Without the help of all of these people this event would not be possible.

Although much has been accomplished in the last few years in the area of information forensics and security, we hope that this workshop will serve to further spur future research, and help ensure that this nascent field will continue to flourish both in theory and practice.

2011 International Workshop on Information Forensics and Security (WIFS) Chairs

Anderson Rocha (Unicamp, Brazil)
C.-C. Jay Kuo (USC, USA)
Dinei Florencio (Microsoft Research, USA)
Nasir Memon (NYU-Poly, USA)
Wade Trappe (Rutgers, USA)

2011 IEEE International Workshop on Information Forensics and Security (WIFS)

PROGRAM

Tuesday, November 29th, 2011

Tutorials

9:00 – 13:00 Morning Tutorial (T1)

9:00 – 13:00 Morning Tutorial (T3)

14:00 – 18:00 Afternoon Tutorial (T2)

14:00 – 18:00 Afternoon Tutorial (T4)

Wednesday, November 30th, 2011

8:45 – 9:00 Opening

Session Chair: Anderson Rocha, Dinei Florencio, Nasir Memon

9:00 – 10:00 Keynote Iris Recognition: Challenges, Advances, and Generalizations

by Dr. **Patrick Flynn**, Professor Computer Science, University of Notre Dame.

Session Chair: Nasir Memon

Coffee break

10:30 – 11:50 Paper Session (lecture): Biometrics I

Session Chair: Eugene Liscio

- “Mixing Fingerprints For Generating Virtual Identities,” Asem Othman, Arun Ross.
- “Eye Detection in the Middle-Wave Infrared Spectrum: Towards Recognition in the Dark,” Thirimachos Bourlai, Zain Jafri
- “Laplacian of smoothed image as representation for face recognition,” Anil Sao, Bayya Yegnanarayana
- “Attack using reconstructed fingerprint,” Sheng Li, Alex Kot

12:00 – 13:10 Lunch

13:10 - 14:10 WIFS Special Event: IC Media Challenge-1

Session Chair: Gwenael Doerr

14:10 – 15:50 Paper Session (lecture): Computer and Network Forensics: In the Computer
Session Chair: Sabu Emmanuel

- “Software Code Obfuscation by Hiding Control Flow Information in Stack,” Vivek Balachandran, Sabu Emmanuel
- “Holmes: A Data Theft Forensic Framework,” Ramya Jayaram Masti, Vincent Lenders, Mario Strasser, Stefan Engel, Bernhard Plattner
- “Painless Migration from Passwords to Two Factor Authentication,” Ziqing Mao, Dinei Florencio, Cormac Herley
- “SmartCM A Smart Card Fault Injection Simulator,” Lanet Jean-Louis, Cartigny Julien, Machemie Jean Baptiste, Mazin Clement
- “Division between Encrypted Integers by Means of Garbled Circuits,” Riccardo Lazzeretti, Mauro Barni

Coffee break

16:20 – 18:20 Paper Session (lecture): Multimedia Forensics and Security I: New Techniques
Session Chair: Mauro Barni

- “Cross Camera People Counting with Perspective Estimation and Occlusion Handling,” Tsung-Yi Lin, Yen-Yu Lin, Ming-Fang Weng, Yu-Chiang Wang, Yu-Feng Hsu, H.-Y. Liao
- “Video Phylogeny: Recovering Near-Duplicate Video Relationships,” Zanon Dias, Anderson Rocha, Siome Goldenstein
- “A Dempster-Shafer Framework for Decision Fusion in Image Forensics,” Marco Fontani, Tiziano Bianchi, Alessia De Rosa, Alessandro Piva, Mauro Barni
- “An analysis on attacker actions in fingerprint-copy attack in source camera identification,” Roberto Caldelli, Irene Amerini, Andrea Novi
- “Fast matching for video/audio fingerprinting algorithms,” Mani Malek Esmaeili, Rabab Ward, Mehrdad Fatourehchi
- “Prefilter Design for Forensic Resampling Estimation,” David Vázquez-Padín, Fernando Pérez-González

18:20 – 19:30 IFS-TC Meeting

19:30 – 22:00 Welcome Reception (@ Mabu Hotel)

Thursday, December 1st, 2011

9:00 – 10:00 Keynote: Cloud Security: What's New?

by Dr. **Bill Horne**, Research Manager, Hewlett-Packard Laboratories.

Session Chair: Anderson Rocha

Coffee break

10:30 - 12:10 Paper Session (lecture): Biometrics II:

Session Chair: Patrick Flynn

- “Pupil Detection under Lighting and Pose Variations in the Visible and Active Infrared Bands,” Thirimachos Bourlai, Cameron Whitelam, Ioannis Kakadiaris
- “On the Consistency of the Biometric Menagerie for Irises and Iris Matchers,” Jeffrey Paone, Patrick Flynn
- “How Contact Pressure, Contact Time, Smearing and Oil/Skin Lotion Influence the Aging of Latent Fingerprint Traces: First Results for the Binary Pixel Feature using a CWL Sensor,” Ronny Merkel, Jana Dittmann, Claus Vielhauer
- “A Study of Face Recognition of Identical Twins by Humans,” Soma Biswas, Kevin Bowyer, Patrick Flynn
- “Brain waves based user recognition using the “Eyes Closed Resting Conditions” protocol,” Patrizio Campisi, Gaetano Scarano, Fabio Babiloni, Fabrizio De Vico Fallani, Stefania Colonnese, Emanuele Maiorana, Laura Forastiere

12:10 – 13:10 Lunch

13:10 - 14:10 WIFS Special Event: IC Media Challenge-2

Session Chair: Walter Scheirer

14:10 - 15:50 Poster Session with Coffee break

Session Chair: Husrev Sencar

16:20 - 18:20 Paper Session (lecture): Multimedia Forensics and Security II

Session Chair: Ton Kalker

- “Analysis of Non-Aligned Double JPEG Artifacts for the Localization of Image Forgeries,” Tiziano Bianchi, Alessandro Piva
- “Exploring DCT Coefficient Quantization Effect for Image Tampering Localization,” Wei Wang, Jing Dong, Tieniu Tan
- “Audio Codec Identification Through Payload Sampling,” Husrev Sencar, Samet Hicsonmez, İsmail Avcıbaşı
- “Context Intra-coding Scheme for Securing Surveillance Videos and Its Applications,” Yi-Chong Zeng, Chiou-Ting Hsu
- “DWT-based additive image watermarking using the Student-t prior,” Antonis Mairgiotis, Yongyi Yang, Lisimachos Kondis
- “Smart Selective Encryption of CAVLC for H.264/AVC Video,” Loïc Dubois, William Puech, Jacques Blanc-Talon

19:30 - 22:00 Conference dinner (@ Mabu Hotel)

Friday, December 2nd, 2011

9:00 – 10:00 Keynote: Watermarking: Quo Vadis?

by Dr. **Ton Kalker**, VP Research, Huawei Technologies.

Session Chair: Dinei Florencio

Coffee break

10:30 – 12:10 Paper Session (lecture): Signal Processing for Forensics

Session Chair: Shantanu Rane

- “Secure Binary Embeddings for Privacy Preserving Nearest Neighbors,” Petros Boufounos , Shantanu Rane
- “Cumulants-Based Radar Specific Emitter Identification,” Pierluigi Failla, Augusto Aubry, Vincenzo Carotenuto , Antonio De Maio , Alessandro Bazzoni
- “ElectroMagnetic Analysis (EMA) of Software AES on Java Mobile Phones,” Driss Aboulkassimi, Laurent Freund, Michel Agoyan , Jacques Fournier , Bruno Robisson, Assia Tria
- ““Re-synchronization by Moments”: an efficient solution to align Side-Channel traces,” Nicolas Debande , Youssef Souissi , Maxime Nassar , Sylvain Guilley , Thanh Ha Le , Jean-Luc Danger
- “Improved Spread Spectrum Multibit Watermarking,” Joceli Mayer

12:10 – 13:10 Lunch

13:10 - 14:10 WIFS Special Event: IC Media Challenge-3

Session Chair: Siome Goldenstein

14:10 – 15:50 Paper Session (lecture): Computer and Network Security: In the Network

Session Chair: Fernando Pérez-González

- “BotCloud: Detecting Botnets Using MapReduce,” Jérôme François , Shaonan Wang , Walter Bronzi , Radu State, Thomas Engel
- “Splay Trees based Early Packet Rejection Mechanism against DoS Traffic Targeting Firewall Default Security Rule,” Zouheir Trabelsi , Safaa Zeidan
- “Channel Aware Encryption and Decision Fusion for Wireless Sensor Networks,” Hyongsuk Jeon , Jinho Choi, Steven McLaughlin , Jeongseok Ha
- “Fingerprinting Tor's Hidden Service Log Files Using a Timing Channel,” Juan Elices , Fernando Pérez-González , Carmela Troncoso
- “A novel algorithm for obfuscated code analysis,” Breno Pinto , Ryan Barnett

Coffee break

16:20 – 17:40 Paper Session (lecture): Foundations for Forensics

Session Chair: C.-C. Jay Kuo

- “Lower Bounds on Almost-Separating Binary Codes,” Jose Moreira, Grigory Kabatianskiy, Marcel Fernández
- “Use of Turbo Codes with Low-Rate Convolutional Constituent Codes in Fingerprinting Scenarios,” Joan Tomàs-Buliart, Ana Gómez-Muro, Marcel Fernández, Miguel Soriano
- “Variable Window Power Spectral Density Attack,” Philip Rodgers, Kean Hong Boey, Maire O'Neill
- “Efficient Privacy Preserving K-means Clustering in a Three-Party Setting,” Michael Beye, Zekeriya Erkin, Inald Lagendijk

17:40 - 18:00 - Closing remarks

Details – Plenary Talks

Iris Recognition: Challenges, Advances, and Generalizations

Dr. Patrick J. Flynn

Professor of Computer Science and Engineering

Concurrent Professor of Electrical Engineering

University of Notre Dame, USA

Abstract: Iris Recognition has emerged as a high-speed, high-performing biometric technique, with current and planned deployments that will affect billions of people. The number of research projects, commercial offerings, and publications in the iris recognition area has increased significantly over the past ten years. The impact of this higher level of activity can be seen in increased flexibility in iris image capture, increased accommodation of non-ideal imaging conditions, integration with other biometric modes, and significant independent evaluations of iris recognition technology supported by data sets of increasing size. This presentation will provide some historical context to iris recognition research, discuss the data and algorithms available to support basic research in the area, and discuss two recent research efforts dealing with recognition from the periocular region and improvements in recognition performance by geometric perturbations of iris templates.

Cloud Security: What's New?

Dr. William Horne

Research Manager in the Cloud and Security Lab of Hewlett-Packard Labs

Abstract: According to a recent study by Goldman Sachs, 70% of CIOs say cloud security is a major concern. But, why? What makes cloud security any different from data center security? What makes cloud security any different from outsourcing security? In this talk, I will examine the security issues surrounding cloud computing, describe what is old and what is new, and give some perspectives on some interesting research problems.

Watermarking: Quo Vadis?

Dr. Ton Kalker

VP of Technology na FutureWei Technologies

Abstract: In the mid-nineties, data-hiding and watermarking became a 'hot' topic. Watermarking was seen as the panacea for all multimedia security problems and this perception led to an incredible surge in publications and conferences on watermarking. Great progress was made in the theoretical understanding and practical implementations of data-hiding techniques. However, now after 15 years of great advances, there are indications that the rate of progress has slowed down and that we are in a post-inflation period. In this keynote, we try to understand this perceived slow down. Are we at the end of watermarking or is there still plenty out there to be discovered?

Details – Tutorials

(T1) Information Security from a Hardware Perspective: Challenges and Solutions

by Dr. Debdeep Mukhopadhyay and Dr. Rajat Subhra Chakraborty (IIT Kharagpur)

(T2) Social Science and its Impact on Cyber Security

by Dr. Deanna D. Caputo (The Mitre Corporation)

(T3 – Invited) Multimedia Forensics

by Dr. Nasir Memon (NYU Poly)

(T4 – Invited) 3-D Reconstruction tools and techniques for Forensics and Surveillance

by Dr. Eugene Liscio (AI2-3D)

Observations

The tutorials are **free of charge** to all WIFS attendees

Details – WIFS Session on Work in Progress (WIP)

Poster Session

Thursday, December 1st

14:10 - 15:50 Poster Session with Coffee break

ID	Title	Presenters
1	<i>A Multiresolution Time-Frequency Analysis Based Side Channel Attacks</i>	Nicolas Debande, Youssef Souissi, A. El Aabid, Sylvain Guilley and Jean-Luc Danger
2	<i>Automating the chain of custody using RFID technology to support the validation of forensics evidence</i>	D. B. Viríssimo, A. Santiago, M. C. Machado, M. Y. Miyake, V. D. Giarone, M. G. Mazziero, H. F. W. Puhlmann, L. O. A. Ruiz
3	<i>Calibration of Blind Image Steganalysis</i>	Christopher B. Smiths and Sos S. Agaian
4	<i>Detecting Cheating Behaviors in Cyber Competitions by Constructing Competition Network</i>	Yuhong Liu and Yan (Lindsay) Sun
5	<i>Link Discovery in Broadcast Networks</i>	Christopher Smith
6	<i>On Discovering the Compressive Sensing Matrix From Few Signal/Measurement Pairs</i>	Hyrum S. Anderson
7	<i>Secure Protocols for Wireless Body Area Networks</i>	Cecilia Vallejos de Schatz, Henry Ponti Medeiros, Fabio K. Schneider
8	<i>Securing Speaker Verification System Against Replay Attack</i>	Hafiz Malik

WIFS Special Event – IC Media Challenge Details

The following sessions will be presented by forensics experts from the Brazilian Federal Police (DPF). The “challenges” represent problems that DPF normally faces in their work.

30/11/2011 – "WIFS Special Event: IC Media Challenge-1"

Session Chair: Gwenael Doerr

13:10-14:10

- (1) Chemical profile of illicit drugs
- (2) Identification of marijuana and coca plantations from satellite imagery
- (3) Face Recognition: computer aided methods for cephalometric landmarks marking
- (4) Diamond “DNA” project: Diamond Gemstones source attribution

01/12/11 – "WIFS Special Event: IC Media Challenge-2"

Session Chair: Walter Scheirer

13:10-14:10

- (5) Determining the writing anteriority in overlapping traces of handwritten documents obtained with different incident light wavelengths
- (6) Content-based image retrieval, banknotes OCR and time-geographic money profile
- (7) Computer Aided Speaker Segmentation and Audio-based content retrieval: speaker dependent and independent approaches
- (8) Automatic Detection of Child Porn on P2P Networks

02/12/11 – “WIFS Special Event: IC Media Challenge-3”

Session Chair: Siome Goldenstein

13:10-14:10

- (9) Automatic Detection of Child Pornographic Images
- (10) Content-based (semantic) Image compression
- (11) CFTV super resolution
- (12) Calculating speed and position of vehicles from images

WIFS Special Event – IC Media Cases and Demo Track (Posters)

Thursday, December 1st

14:10 - 15:50 Poster Session with Coffee break

ID	Title	Presenters
1	<i>Gunfire Categorizations: The Rondonópolis Case</i>	PCF Paulo Max Gil Innocêncio Reis
2	<i>3D simulated dynamics of accidents based on aircraft black box retrieved information: the TAM case – tech-demo</i>	PCF Carlos Eduardo Palhares Machado; PCF Daniel França de Oliveira Melo
3	<i>Simulated reproduction: a real case of a dam accident – tech-demo</i>	PCF Daniel França de Oliveira Melo; PCF Carlos Eduardo Palhares Machado;
4	<i>Monitoring Child Pornographic Images Publication on P2P Networks</i>	PCF Guilherme Martini Dalpian
5	<i>NuDetective: Quick Detection of Child Pornographic Files at Crime Scenes</i>	PCF Mateus Polastro; PCF Pedro M S Eleutério
6	<i>Content-based image retrieval, banknotes OCR and time-geographic money profile</i>	PCF Jorge de Albuquerque Lambert; PCF Paulo Max Gil Innocencio reis; PCF Michel dos Santos Bitana
7	<i>Computer Aided Speaker Segmentation</i>	PCRJ Erlon Gonçalves Reis, Dirceu Gonzaga da Silva, André Gustavo Adami
8	<i>Ballpen ink classification – reflectance spectra KNN analysis</i>	Isabella C. F. Peixoto, PCF Marcio Talhavini, PCF Jorge Jardim Zacca, Jez WB Braga
9	<i>Residual Solvent Analysis of Cocaine Seizures in Brazil</i>	PCF Adriano Maldaner, PCF Jorge Jardim Zacca
10	<i>Identification of Cannabis and Coca Plantations from Satellite Imagery</i>	PCF Daniel Russo; PCF Daniel Araújo Miranda; PCF Marcelo de Lawrence Bassay Blum
11	<i>Historic Reconstruction of the Distribution of Graves in The Vila Formosa Cemetery, São Paulo</i>	PCF Marcelo de Lawrence Bassay Blum; PCF Daniel Russo

Sponsored by



Local Partners



Additional Financial Support from

