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PROCEEDINGS

Media Watermarking, Security, and Forensics 2017

Editors: **Adnan M. Alattar,** Digimarc Corp. (United States),
Nasir D. Memon, Tandon School of Engineering, New York Univ. (United States)

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Society for Imaging Science and Technology
7003 Kilworth Lane • Springfield, VA 22151 USA
703/642-9090
703/642-9094 fax
info@imaging.org
www.imaging.org

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Media Watermarking, Security, and Forensics 2017

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Media Watermarking, Security, and Forensics 2017

Monday, January 30, 2017

Keynote 1: Media Forensics
Session Chair: Adnan Alattar, Digimarc Corporation (United States)
8:50 – 10:10 am
Regency Ballroom A

The nimble challenges for media forensics, *P. Jonathon Phillips, National Institute of Standards and Technology (NIST) (United States)* [MWSF-316]

Jonathon Phillips is a leading technologist in the fields of computer vision, biometrics, and face recognition. He is at National Institute of Standards and Technology (NIST), where he runs challenge problems and evaluations to advance biometric technology. His previous efforts include the Iris Challenge Evaluations (ICE), the Face Recognition Vendor Test (FRVT), the Face Recognition Grand Challenge and FERET. From 2000-2004, Phillips was assigned to DARPA. For his work on the FRVT 2002 he was awarded the Dept. of Commerce Gold Medal. His work has been reported in the New York Times, the BBC, and the Economist. He has appeared on NPR's Science Friday show. In an Essential Science Indicators analysis of face recognition publication over the past decade, Phillips' work ranks at #2 by total citations and #1 by cites per paper. In 2013, he won the inaugural Mark Everingham Prize. He is a fellow of the IEEE and IAPR.

10:10 – 10:30 am Coffee Break

Watermarking

Session Chair: William Puech, University of Montpellier (France)

10:30 – 11:45 am
Regency Ballroom A

10:30 6
Embedding information into objects fabricated with 3-D printers by forming fine cavities inside them, *Masahiro Suzuki[1], Pailin Dechrueng[2], Soravit Techavichian[2], Piyarat Silapasuphakornwong[1], Hideyuki Torii[1], and Kazutake Uehira[1]; [1]Kanagawa Institute of Technology (Japan) and [2]Chulalongkorn University (Thailand)* [MWSF-317]

10:55 10
High-capacity reversible data hiding in encrypted images using MSB prediction, *Pauline Puteaux and William Puech, University of Montpellier (France)* [MWSF-319]

11:20 16
The A Priori knowledge based secure payload estimation for additive model, *Sai Ma[1,2], Xianfeng Zhao[1,2], Qingxiao Guan[1,2], and Chengduo Zhao[1,2]; [1]Institute of Information Engineering, Chinese Academy of Sciences and [2]University of Chinese Academy of Sciences (China)* [MWSF-320]

11:45 am – 2:00 pm Lunch Break

EI 2017 Opening Plenary and Symposium Awards
Session Chairs: Joyce E. Farrell, Stanford University, and Nitin Sampat, Rochester Institute of Technology (United States)
2:00 – 3:00 pm
Grand Peninsula Ballroom D

Giga-scale 3D computational microscopy, *Laura Waller, University of California, Berkeley (United States)*

Laura Waller is the Ted Van Duzer Endowed Assistant Professor of Electrical Engineering and Computer Sciences (EECS) at UC Berkeley. She is a Senior Fellow at the Berkeley Institute of Data Science, and received her BS (2004), MEng (2005), and PhD (2010) in EECS from the Massachusetts Institute of Technology (MIT). Waller's talk is on computational imaging methods for fast capture of gigapixel-scale 3D intensity and phase images in a commercial microscope that employs illumination-side and detection-side coding of angle (Fourier) space with simple hardware and fast acquisition. The result is high-resolution reconstructions across a large field-of-view, achieving high space-bandwith-time product.

3:00 – 3:30 pm Coffee Break

Encryption

Session Chair: Gaurav Sharma, University of Rochester (United States)

3:30 – 4:50 pm
Regency Ballroom A

3:30 22
Benefits of combining forensic image creation and file carving, *York Yannikos, Martin Steinebach, and Michael Rettig, Fraunhofer SIT (Germany)* [MWSF-321]

3:55 28
MP3 partial encryption for DRM, *Martin Steinebach and Waldemar Berchtold, Fraunhofer SIT (Germany)* [MWSF-322]

4:20 36
How to recompress a JPEG crypto-compressed image?, *Vincent Itier[1] and William Puech[2]; [1]LIRMM and [2]University of Montpellier (France)* [MWSF-323]

Symposium Welcome Reception
5:00 – 6:00 pm
Atrium

Tuesday, January 31, 2017

Deep Learning Steganalysis

Session Chair: Jessica Fridrich, SUNY Binghamton (United States)

8:50 – 10:10 am
Regency Ballroom A

8:50 44
Pre-training via fitting deep neural network to rich-model features extraction procedure and its effect on deep learning for steganalysis, *Jishen Zeng, Shunquan Tan, Bin Li, and Jiwu Huang; Shenzhen University and Shenzhen Key Laboratory of Media Security (China)* [MWSF-324]

9:15 50
Histogram layer, moving convolutional neural networks towards feature-based steganalysis, *Vahid Sedighianaraki and Jessica Fridrich, Binghamton Universtiy (United States)* [MWSF-325]

9:40 56
Model based steganography with precover, *Tomáš Denemark and Jessica Fridrich, SUNY Binghamton (United States)* [MWSF-326]

10:00 am – 7:30 pm Industry Exhibition

10:10 – 10:30 am Coffee Break

CNN and RNN Forensics

Session Chair: Marc Chaumont, LIRMM Montpellier France (France)

10:30 am – 12:10 pm
Regency Ballroom A

10:30 67
A preliminary study on convolutional neural networks for camera model identification, *Luca Bondi[1], David Güera Cobo[2], Luca Baroffio[1], Paolo Bestagini[1], Edward Delp[2], and Stefano Tubaro[1]; [1]Politecnico di Milano (Italy) and [2]Purdue University (United States)* [MWSF-327]

10:55 77
Design principles of convolutional neural networks for multimedia forensics, *Belhassen Bayar and Matthew Stamm, Drexel University (United States)* [MWSF-328]

11:20 87
Image recapture detection with convolutional and recurrent neural networks, *Haoliang Li, Shiqi Wang, and Alex Kot, Nanyang Technological University (Singapore)* [MWSF-329]

11:45 92
Autoencoder with recurrent neural networks for video forgery detection, *Dario D'Avino, Davide Cozzolino, Giovanni Poggi, and Luisa Verdoliva, University Federico II of Naples (Italy)* [MWSF-330]

12:10 – 2:00 pm Lunch Break

EI 2017 Tuesday Plenary and Symposium Awards
Session Chairs: Joyce E. Farrell, Stanford University, and Nitin Sampat, Rochester Institute of Technology (United States)
2:00 – 3:00 pm
Grand Peninsula Ballroom D

VR 2.0: Making virtual reality better than reality, *Gordon Wetzstein, Stanford University (United States)*

Gordon Wetzstein is an Assistant Professor of Electrical Engineering and, by courtesy, of Computer Science, at Stanford University, and leads the Stanford Computational Imaging Group. He received a PhD in computer science from the University of British Columbia (2011) where his doctoral dissertation focused on computational light modulation for image acquisition and display. In his talk, Wetzstein explores the frontiers of VR systems engineering. Eventually, VR/AR systems will redefine communication, entertainment, education, collaborative work, simulation, training, telesurgery, and basic vision research, as next-generation computational near-eye displays evolve to deliver visual experiences that are better than the real world.

3:00 – 3:30 pm Coffee Break

Keynote 2: Camera Verification in Practice
Session Chair: Nasir Memon, New York University (United States)
3:30 – 4:30 pm
Regency Ballroom A

PRNU in practice, *Walter Bruehs, Federal Bureau of Investigation (United States)* [MWSF-339]

Walter E. Bruehs is employed by the Federal Bureau of Investigation as the Supervisory Photographic Technologist in the Forensic Audio, Video, and Image Analysis Unit, where he is an Examiner of Questioned Photographic Evidence. Part of Bruehs' responsibilities focus on seeking out and researching emerging digital imaging technologies as they apply to the Forensic arena. He heads a program designed to identify digital images to digital cameras or to other sets of digital images, based on the sensor noise of the capture device. He has a MS in electrical engineering from the University of Maine at Orono, as well as a BS in electrical engineering from Clarkson University. Prior to working at the FBI, he worked as an Imaging Scientist in the research labs of the Eastman Kodak Company, where he co-authored a patent, "Method and System for Improving an Image Characteristic Based on Image Content."

Media Watermarking, Security, and Forensics Program Committee Meeting

4:40 – 6:00 pm
Regency Ballroom A

Symposium Demonstration Session
5:30 – 7:30 pm
Grand Peninsula Ballroom E

Wednesday, February 1, 2017

Sensor Noise Forensics

Session Chair: Robert Ulichney, HP Labs, HP Inc. (United States)

8:50 – 10:10 am
Regency Ballroom A

8:50 100
Videos versus still images: Asymmetric sensor pattern noise comparison on mobile phones, *Chiara Galdi[1], Frank Hartung[2], and Jean-Luc Dugelay[1]; [1]Eurecom (France) and [2]FH Aachen (Germany)* [MWSF-331]

9:15 104
Linear filter kernel estimation based on digital camera sensor noise, *Chang Liu and Matthias Kirchner, Binghamton University (United States)* [MWSF-332]

9:40 113
PRNU-based image manipulation localization with discriminative random fields, *Sujoy Chakraborty and Matthias Kirchner, Binghamton University (United States)* [MWSF-333]

10:00 am – 4:00 pm Industry Exhibition

10:10 – 10:30 am Coffee Break

Forensics & Authentication

Session Chair: Matthias Kirchner, Binghamton University (United States)

10:30 am – 12:15 pm
Regency Ballroom A

10:30 121
Sensitivity of different correlation measures to print-and-scan process, *Iuliia Tkachenko[1], Christophe Destruel[2], Olivier Strauss[3], and William Puech[3]; [1]University of La Rochelle, [2]Authentication Industries, and [3]University of Montpellier (France)* [MWSF-335]

10:55 128
Scalable processing history detector for JPEG images, *Mehdi Boroumand and Jessica Fridrich, SUNY Binghamton (United States)* [MWSF-336]

11:20 138
Deciphering severely degraded license plates, *Shruti Agarwal, Du Tran, Lorenzo Torresani, and Hany Farid, Dartmouth College (United States)* [MWSF-337]

11:45 144
PCB surface fingerprints based counterfeit detection of electronic devices, *Taswar Iqbal and Kai-Dietrich Wolf, Institute for Security Sytems, University of Wuppertal (Germany)* [MWSF-338]

12:10
Conference Closing Remarks

12:15 – 2:00 pm Lunch Break

EI 2017 Wednesday Plenary and Symposium Awards
Session Chairs: Joyce E. Farrell, Stanford University, and Nitin Sampat, Rochester Institute of Technology (United States)
2:00 – 3:00 pm
Grand Peninsula Ballroom D

Designing VR video camera systems, *Brian Cabral, Facebook, Inc. (United States)*

Brian Cabral is Director of Engineering at Facebook, leading the Surround 360 VR camera team, specializing in computational photography, computer vision, and computer graphics. He has published a number of papers in the area of computer graphics and imaging including the pioneering Line Integral Convolution algorithm. Cabral discusses developing Facebook Surround 360, an open, high-quality 3D-360 video capture system. VR video capture systems are composed of multiple optical and digital components - all of which must operate as if they are one seamless optical system. The design of VR video cameras, optical choices, SNR, etc., require a new set of technologies and engineering approaches, with tight coupling to the computational system components.

3:00 – 3:30 pm Coffee Break

Symposium Interactive Papers (Poster) Session
5:30 – 7:00 pm
Atrium