



# Technical Program

## Monday, June 13, 2016

**08:30 – 09:00 Registration**

**09:00 – 12:00 Morning Tutorials**

**Tutorial I: Privacy Preserving Biometric Identity Verification**

G rard Chollet, CNRS-LTCI, IMT, France; Dijana Petrovska-Delacr taz, Mines Telecom / Telecom SudParis, France; Bhiksha Raj, Carnegie Mellon University, USA

**Tutorial II: 3D Morphable Face Models and Their Applications**

Josef Kittler, University of Surrey, UK; Paul Koppen, University of Surrey, UK

**13:30 – 16:30: Afternoon Tutorials**

**Tutorial III: Contactless 3D Fingerprint Acquisition and Matching**

Ajay Kumar, Hong Kong Polytechnic University, Hong Kong

**Tutorial IV: BEAT With Hands-On: An Online Web-Platform For Reproducible Research In Computational Science**

Andre Anjos, Idiap Research Institute; Switzerland; Laurent El Shafey, Idiap Research Institute; Switzerland; Sebastien Marcel, Idiap Research Institute; Switzerland

**17:30**

**WELCOME RECEPTION**

Halmstad Castle and Scandic Hallandia Hotel

## Tuesday, June 14, 2016

**08:00 – 09:00 Registration**

**08:30 – 09:00 Welcome by General Chairs and Program Chairs**

**09:00 - 10:00 Keynote Lecture – I**

**Chair:** Josef Bigun, Halmstad University

**“Internet-Scale Adoption of Biometrics: Analysis and Next Steps”**

David Burnett, Vice President for Global Ecosystem Development, Fingerprint Cards AB

**10:00 - 10:30 Coffee Break**

**10:30 – 11:50 Oral Session I: Fingerprint Biometrics**

**Chair:** Phalguni Gupta, Indian Institute of Technology Kanpur

**O1: Multi-scale Dictionaries Based Fingerprint Orientation Field Estimation**

Chunjie Chen, Tsinghua University; Jianjiang Feng, Tsinghua University; Jie Zhou, Tsinghua University

**O2: Learning Compact Binary Quantization of Minutia Cylinder Code**

Chaochao Bai, School of Computer & Control, University of Chinese Academy of Sciences; Weiqiang Wang, School of Computer & Control, University of Chinese Academy of Sciences; Tong Zhao, School of Mathematical Sciences, University of Chinese Academy of Sciences; Mingqiang Li, School of Mathematical Sciences, University of Chinese Academy of Sciences

**O3: Automatic Latent Value Determination**

Kai Cao, Michigan State University; Tarang Chugh, Michigan State University; Jiayu Zhou, Michigan State University; Elham Tabassi, NIST, USA; Anil Jain, Michigan State University



# The 9th IAPR International Conference on Biometrics

## **O4: Methodology for Partial Fingerprint Enrollment and Authentication on Mobile Devices**

Surbhi Mathur, Samsung R&D Institute India; Ankit Vijay, Samsung R&D Institute India; Jidnya Shah, Samsung R&D Institute India; Shreyasi Das, Samsung R&D Institute India; Adil Hamid Malla, Samsung R&D Institute India

## **11:50 – 13:10 Poster Spotlight - I**

**Chairs:** Ajay Kumar, Hong Kong Polytechnic University, Gian Luca Marcialis, University of Cagliari

### **P1: Latent Fingerprint Segmentation Based on Linear Density**

Shuxin Liu, East China Normal University; Manhua Liu, Shanghai Jiao Tong University; Songyuan Yang, East China Normal University

### **P2: User-Specific Effects in Fingerprint Presentation Attacks Detection: Insights for Future Research**

Luca Ghiani, University of Cagliari; Gian Luca Marcialis, University of Cagliari; Fabio Roli, University of Cagliari; Pierluigi Tuveri, University of Cagliari

### **P03: Meandering Energy Potential to Locate Singular Point of Fingerprint**

Kamlesh Tiwari, Indian Institute of Technology Kanpur; Phalguni Gupta, Indian Institute of Technology Kanpur

### **P04: Performance Analysis of a Hybrid Fingerprint Extracted from Optical Coherence Tomography Fingertip Scans**

Luke Darlow, CSIR; James Connan, Rhodes University; Ann Singh, Council for Scientific and Industrial Research

### **P05: Fine-grained LFW Database**

Nanghai Zhang, Beijing University of Posts and Telecommunications; Weihong Deng, Beijing University of Posts and Telecommunications

### **P06: Face Attribute Prediction Using Off-the-Shelf Deep Learning Networks**

Yang Zhong, KTH, Royal Institute of Technology; Josephine Sullivan, KTH, Royal Institute of Technology; Haibo Li, KTH, Royal Institute of Technology

### **P07: Lock3DFace: A Large-Scale Database of Low-Cost Kinect 3D Faces**

Jinjin Zhang, Beihang University; Di Huang, Beihang University; Yunhong Wang, Beihang University; Jia Sun, Beihang University

### **P08: Extending Non-negative Matrix Factorisation to 3D Registered Data**

Willem Koppen, University of Surrey; William Christmas, University of Surrey; Daniel Crouch, University of Oxford; Walter Bodmer, University of Oxford; Josef Kittler, University of Surrey

### **P09: Bootstrapping Joint Bayesian Method with Application to Unconstrained Face Recognition**

Cheng Cheng, CIGIT, CASIA; Junliang Xing, NLPR, CASIA; Deling Li, CIGIT, CASIA; Youji Feng, CIGIT, CASIA; Xiangdong Zhou, CIGIT, CASIA

### **P10: Discriminative Feature Adaptation for Cross-Domain Facial Expression Recognition**

Zhu Ronghang, Sichuan University, Sang Gaoli, Sichuan University, Zhao Qijun, Sichuan University

### **P11: Gender and Ethnicity Classification using Deep Learning in Heterogeneous Face Recognition**

Neeru Narang, West Virginia University; Thirimachos Bourlai, West Virginia University

### **P12: Transferring Deep Representation for NIR-VIS Heterogeneous Face Recognition**

Xiaoxiang Liu, Chinese Academy of Sciences; Lingxiao Song, Chinese Academy of Sciences; Xiang Wu, Chinese Academy of Sciences; Tieniu Tan, Chinese Academy of Sciences



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### **P13: Multi-task ConvNet for Blind Face Inpainting with Application to Face Verification**

Shu Zhang, Chinese Academy of Sciences; Ran He, Chinese Academy of Sciences; Zhenan Sun, Chinese Academy of Sciences; Tieniu Tan, Chinese Academy of Sciences

### **P14: Real world expression recognition: A highly imbalanced detection problem**

Shan Li, Beijing University of Posts and Telecommunications; Weihong Deng, Beijing University of Posts and Telecommunications

### **P15: Calculating a boundary for the Significance from the Equal-Error Rate**

Heinz Hofbauer, University of Salzburg; Andreas Uhl, University of Salzburg

**13:10 – 14:30 LUNCH**

**14:30 – 16:00 Panel Session – I**

**Chair:** Massimo Tistarelli, University of Sassari

**“Relation/Implications of Forensic Biometrics and Multimedia Forensics”**

**Panelists:** Chang-Tsun Li, University of Warwick; James Loudermilk, FBI Science and Technology Branch; Didier Meuwly, Netherlands Forensic Institute and University of Twente; Massimo Tistarelli, University of Sassari

**16:00 – 16:30 COFFEE BREAK**

**16:00 – 17:30 Poster Session – I + Doctoral Consortium Posters**

**Chairs:** Chang-Tsun Li, University of Warwick and Daigo Muramatsu, Osaka University

## **Wednesday, June 15, 2016**

**08:00 – 09:00 Registration**

**09:00 - 10:00 Keynote Lecture – II**

**Chair:** Didier Meuwly, Netherlands Forensic Institute and University of Twente

**“The FBI Fingerprint Program”**

James Loudermilk, Senior Level Technologist, FBI Science and Technology Branch, USA

**10:00 - 10:30 Coffee Break**

**10:30 – 11:50 Oral Session II: Vascular Biometrics**

**Chair:** Gongping Yang, Shandong University

**O5: Binary Search Path of Vocabulary Tree Based Finger Vein Image Retrieval**

Kuikui Wang, Shandong University; Lu Yang, Shandong University; Kun Su, Shandong University; Gongping Yang, Shandong University; Yilong Yin, Shandong University

**O6: A Study on the Individuality of Finger Vein Based On Statistical Analysis**

Yapeng Ye, Peking University; He Zheng, Peking University; Liao Ni, Peking University; Shilei Liu, Peking University; Wenxin Li, Peking University

**O7: User Individuality based Cost-Sensitive Learning: A Case Study in Finger Vein Recognition**

Lu Yang, Shandong University; Gongping Yang, Shandong University; Yilong Yin, Shandong University; Lizhen Zhou, Shandong University

**O8: Compression Standards in Fingervein Recognition**

Victoria Ablinger, University of Salzburg; Cornelia Zenz, University of Salzburg; Jutta Hämmerle-Uhl, University of Salzburg; Andreas Uhl, University of Salzburg



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## 11:50 – 12:50 Oral Session III: Ocular Biometrics

**Chair:** Andreas Uhl, University of Salzburg

### **O9: IrisSeg: A Fast and Robust Iris Segmentation Framework for Non-Ideal Iris Images**

Abhishek Gangwar, CDAC; Akanksha Joshi, CDAC; Ashutosh Singh, CDAC;  
Fernando Alonso-Fernandez, Halmstad University; Josef Bigun, Halmstad University

### **O10: Biometric Recognition of Surgically Altered Periocular Region: A Comprehensive Study**

Kiran B. Raja, NTNU; Raghavendra Ramachandra, NTNU; Christoph Busch, NTNU

### **O11: Post-mortem Human Iris Recognition**

Mateusz Trokielewicz, NASK; Adam Czajka, Warsaw University of Technology; Piotr Maciejewicz, Medical University of Warsaw

## 12:50 – 14:20 LUNCH

## 12:50 – 14:20 DOCTORAL CONSORTIUM [FOR SELECTED PARTICIPANTS]

**Chairs:** Laurent El Shafey, Idiap; Emanuele Maiorana, Roma Tre University

## 14:20 – 15:20 Oral Session IV: Face Recognition and Analysis

**Chair:** Stan Z Li, Chinese Academy of Science

### **O12: Face Recognition using Scattering Wavelet under Illicit Drug Abuse Variations**

Prateekshit Pandey, IIIT-Delhi; Richa Singh, IIIT-Delhi; Mayank Vatsa, IIIT-Delhi

### **O13: Fast Multi-view Face Alignment via Multi-task Auto-encoders**

Qi Li, Chinese Academy of Sciences; Ran He, Chinese Academy of Sciences; Zhenan Sun, Chinese Academy of Sciences; Tieniu Tan, Chinese Academy of Sciences

### **O14: Two-step Calibration Method for Multi-algorithm Score-based Face Recognition Systems by Minimizing Discrimination Loss**

Nanang Susyanto, University of Amsterdam; Raymond Veldhuis, University of Twente; Luuk Spreeuwers, University of Twente; Chris Klaassen, University of Amsterdam

## 15:20 – 15:45 Coffee Break

## 15:45 – 17:05 Oral Session V: Temporal Biometrics and Fusion

**Chair:** Gerard Chollet, Intelligent Voice

### **O15: Single Pulse ECG-based Small Scale User Authentication using Guided Filtering**

Se Young Chun, UNIST

### **O16: Experimental results on Multi-modal Fusion of EEG-based personal verification algorithms**

Marco Garau, University of Cagliari; Matteo Frascini, University of Cagliari; Gian Luca Marcialis, University of Cagliari; Luca Didaci, University of Cagliari

### **O17: Gait Collector: An Automatic Gait Data Collection System in Conjunction with an Experience-based Long-run Exhibition**

Yasushi Makihara, Osaka University; Takuhiro Kimura, Osaka University; Fumio Okura, Osaka University; Ikuhisa Mitsugami, Osaka University; Masataka Niwa, Osaka University; Chihiro Aoki, Osaka University; Atsuyuki Suzuki, Osaka University; Daigo Muramatsu, Osaka University; Yasushi Yagi, Osaka University

### **O18: Bayesian Belief Models for Integrating Match Scores with Liveness and Quality Measures in a Fingerprint Verification System**

Yaohui Ding, Michigan State University; Ajita Rattani, University of Missouri, Kansas City; Arun Ross, Michigan State University



# The 9th IAPR International Conference on Biometrics

**19:15 BANQUET AND AWARDS CEREMONY (bus from the city center)**  
Restaurant Salt, Tylösand beach

## Thursday, June 16, 2016

**08:00 – 09:00 Registration**

**09:00 - 10:00 Keynote Lecture – III**

**Chair:** Fernando Alonso-Fernandez, Halmstad University

**“Forensic Biometrics: Quantifying Forensic Evidence from Biometric Traces”**

Didier Meuwly, Principal Scientist, Netherlands Forensic Institute and Chair of Forensic Biometrics, University of Twente, The Netherlands

**10:00 - 10:30 Coffee Break**

**10:30 – 11:30 SENIOR BIOMETRICS INVESTIGATOR AWARD (SBIA) TALK**

**Chair:** Josef Kittler, University of Surrey

**“Biometric Entropy: Searching for Doppelgängers and the rare Entropod Uniquorns”**

John Daugman, Professor of Computer Vision and Pattern Recognition, University of Cambridge

**11:30 – 13:00 Poster Spotlight - II**

**Chairs:** Christoph Busch, NTNU; Maria de Marsico, Sapienza University of Rome

**P16: Influence of Cataract Surgery on Iris Recognition: A Preliminary Study**

Raghavendra Ramachandra, NTNU; Kiran B. Raja, NTNU; Vinay Vemuri, NTNU; Swetha Kumari, Jaypriya Hospital, India; Pierre Gacon, Morpho; Emine Krichen, Morpho; Christoph Busch, NTNU

**P17: Exploring Complementary Features for Iris Recognition on Mobile Devices**

Qi Zhang, Chinese Academy of Sciences; Haiqing Li, Chinese Academy of Sciences; Zhenan Sun, Chinese Academy of Sciences; Zhaofeng He, Chinese Academy of Sciences; Tieniu Tan, Chinese Academy of Sciences

**P18: TripleA: Accelerated Accuracy-preserving Alignment for Iris-Codes**

Christian Rathgeb, Center for Advanced Security Research Darmstadt; Heinz Hofbauer, University of Salzburg; Andreas Uhl, University of Salzburg; Christoph Busch, Hochschule Darmstadt

**P19: SSRBC 2016: Sclera Segmentation and Recognition Benchmarking Competition**

Abhijit Das, Griffith University; Umapada Pal, ISI; Miguel Ferrer, ULPGC; Micheal Blumenstein, Griffith University

**P20: Enhanced Segmentation and Complex-Sclera Features for Human Recognition with Unconstrained Visible-Wavelength Imaging**

Sinan Alkassar, Newcastle University; Jonathon Chambers, Newcastle University; Satnam Dlay, Newcastle University; Lok Woo, Newcastle University

**P21: FVRC2016: The 2nd Finger Vein Recognition Competition**

Yapeng Ye, Peking University; Liao Ni, Peking University; He Zheng, Peking University; Shilei Liu, Peking University; Yi Zhu, Xiamen Toyonway Intellectual Technology Co., LTD.; Deng Zhang, Peking University; Weilai Xiang, The High School Affiliated to Renmin University of China; Wenxin Li, Peking University

**P22: 3D Feature Array Involved Registration Algorithm for Multi-pose Hand Vein Authentication**

Yong Qi, Beijing Institute of Technology; Ya Zhou, Beijing Institute of Technology; Xiaoming Hu, Beijing Institute of Technology; Chang Zhou, Beijing Institute of Technology; Xinran Hu, Beijing Institute of Technology



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**P23: Textured Detailed Graph Model for Dorsal Hand Vein Recognition:  
A Holistic Approach**

Renke Zhang, Beihang University; Di Huang, Beihang University; Yunhong Wang, Beihang University

**P24: Obfuscating Keystroke Time Intervals to Avoid Identification and Impersonation**

John Monaco, U.S. Army Research Laboratory; Charles Tappert, Pace University

**P25: Scale space texture analysis for face anti-spoofing**

Zinelabidine Boulkenafet, University of Oulu; Jukka Komulainen, University of Oulu; Xiaoyi Feng, Northwestern Polytechnical University; Abenour Hadid, University of Oulu

**P26: Kinship verification from videos using texture spatio-temporal features  
and deep learning**

Elhocine Boutellaa, CDTA; Miguel Bordallo, University of Oulu; Samy Ait-Aoudia, ESI; Xiaoyi Feng, Northwestern Polytechnical University; Abenour Hadid, University of Oulu

**P27: Reliable Face Anti-Spoofing Using Multispectral SWIR Imaging**

Holger Steiner, Bonn-Rhein-Sieg University of Applied Sciences, Sankt Augustin, Germany; Andreas Kolb, Computer Graphics and Multimedia Systems Group, University of Siegen, Germany; Norbert Jung, Bonn-Rhein-Sieg University of Applied Sciences, Sankt Augustin, Germany

**P28: Towards resolution invariant face recognition in uncontrolled scenarios**

Dan Zeng, Sichuan University, Chengdu; Hu Chen, Sichuan University, Chengdu; Qijun Zhao, Sichuan University, Chengdu

**P29: ICB-RW 2016: International Challenge on Biometric Recognition in the Wild**

João Neves, University of Beira Interior; Hugo Proença, University of Beira Interior

**P30: A Practical Technique for Gait Recognition on Curved and Straight Trajectories**

Fatimah Abdulsattar, Southampton University; John Carter, Southampton University

**13:00 – 14:30 LUNCH**

**14:30 – 16:00 Poster Session – II + Industry Demos**

**Chairs:** Raymond Veldhuis, University of Twente; Yunhong Wang, Beihang University

**15:30 – 16:00 Coffee Break**

**16:00 – 17:20 Oral Session VI: “Best Reviewed Papers”**

**Chair:** Arun Ross, Michigan State University

**O19: GEINet: View-Invariant Gait Recognition Using a Convolutional Neural Network**

Kohei Shiraga, Osaka University; Yasushi Makihara, Osaka University; Daigo Muramatsu, Osaka University; Tomio Echigo, Osaka Electro-Communication University; Yasushi Yagi, Osaka University

**O20: Accurate Iris Segmentation in Non-cooperative Environments Using Fully  
Convolutional Networks**

Nianfeng Liu, Chinese Academy of Sciences; Haiqing Li, Chinese Academy of Sciences; Man Zhang, Chinese Academy of Sciences; Jing Liu, Chinese Academy of Sciences; Zhenan Sun, Chinese Academy of Sciences; Tieniu Tan, Chinese Academy of Sciences

**O21: Tattoo Detection Based on CNN and Remarks on the NIST Database**

Qingyong Xu, Nanyang Technological University; Soham Ghosh, Nanyang Technological University; Xingpeng Xu, Nanyang Technological University; Yi Huang, Nanyang Technological University; Adams Wai Kin Kong, Nanyang Technological University

**O22: Exploiting Privileged Information for Facial Expression Recognition**

Michalis Vrigkas, University of Ioannina; Christophoros Nikou, University of Ioannina; Ioannis Kakadiaris, University of Houston

**17:20 – 18:00 Closing Comments + ICB 2016 Group Photo**