



Tue, Jun 4

09:30–12:30 MORNING TUTORIALS

T1: “Latent Fingerprint and Palmprint Recognition”
Jianjiang Feng, *University Tsinghua, China*

T3: “Sparse Representation and Biometrics”
Allen Yang, *University of California Berkeley, USA*

14:00–17:00 AFTERNOON TUTORIALS

T4: “Evidential Evaluation in Forensic Biometrics”
Joaquín González-Rodríguez, and Daniel Ramos-Castro, *Universidad Autónoma de Madrid, Spain*
Supported by COST Action IC-1106

T6: “Biometric Template Protection: A Unified View of Fundamental Concepts, System Architectures, and Research Challenges”
Shantanu Rane, *Mitsubishi Electric Research Lab, USA*

Wed, Jun 5

08:40–09:00 CONFERENCE OPENING

Javier Ortega-García, *General Chair ICB-2013*

09:00–10:00 KEYNOTE SPEAKER 1
Chair: **Javier Ortega-García, Universidad Autonoma de Madrid, Spain**

“50 Years of Biometric Research: The Solved, The Unsolved, and The Unexplored”
Anil K. Jain, *Michigan State University, USA*

10:30–11:50 ORAL SESSION 1: FACE REPRESENTATION AND FUSION
Chair: **Josef Kittler, University of Surrey, UK**

OS1.1. A Compact Discriminative Representation for Efficient Image-set Classification with Application to Biometric Recognition
Muhammad Uzair, *The University of Western Australia, Australia*; Arif Mahmood, *The University of Western Australia, Australia*; Ajmal Mian, *The University of Western Australia, Australia*; Chris McDonald, *The University of Western Australia, Australia*

OS1.2. Human Identification using Facial Comparative Descriptions
Daniel Reid, *University of Southampton, UK*; Mark Nixon, *University of Southampton, UK*

OS1.3. Volume Structured Ordinal Features with Background Similarity Measure for Video Face Recognition
Heydi Mendez-Vazquez, *Advanced Technologies Application Center (CENATAV), Cuba*; Yoanna Martinez-Diaz, *Advanced Technologies Application Center (CENATAV), Cuba*; Zhenhua Chai, *Institute of Automation, Chinese Academy of Sciences, China*

OS1.4. Can We Do Better in Unimodal Biometric Systems? A Novel Rank-based Score Normalization Framework for Multi-sample Galleries
Ioannis Kakadiaris, *University of Houston, USA*; Panagiotis Moutafis, *University of Houston, USA*

13:45–15:05 ORAL SESSION 2: EAR AND BEHAVIORAL BIOMETRICS
Chair: **Mark Nixon, University of Southampton, UK**

OS2.1. Robust Localization of Ears by Feature Level Fusion and Context Information
Anika Pflug, *Hochschule Darmstadt, Germany*; Adrian Winterstein, *Hochschule Darmstadt, Germany*; Christoph Busch, *Hochschule Darmstadt, Germany*

OS2.2. Synthetic Off-Line Signature Image Generation

Miguel Ferrer-Ballester, ; Moises Diaz-Cabrera, *Universidad de Las Palmas de Gran Canaria, Spain*; Aythami Morales, *Universidad de Las Palmas de Gran Canaria, Spain*

OS2.3. Formant Trajectories in Linguistic Units for Text-Independent Speaker Recognition

Javier Franco-Pedroso, *Universidad Autonoma de Madrid, Spain*; Fernando Espinoza-Cuadros, *Universidad Autonoma de Madrid, Spain*; Joaquin Gonzalez-Rodriguez, *Universidad Autonoma de Madrid, Spain*

OS2.4. Biometric Authentication via Keystroke Sound

Joseph Roth, *Michigan State University, USA*; Xiaoming Liu, *Michigan State University, USA*; Arun Ross, *Michigan State University, USA*; Dimitris Metaxas, *Rutgers University, USA*

15:05–16:30 POSTER SESSION 1

Chairs: **Julian Fierrez², Zhenan Sun²**; ¹*Universidad Autonoma de Madrid, Spain*; ²*National Lab. of Pattern Rec., CASIA, China*

PS1.1. Face Liveness Detection with Component Dependent Descriptor

Jianwei Yang, *Institute of Automation, Chinese Academy of Sciences, China*; Zhen Lei, *Institute of Automation, Chinese Academy of Sciences, China*; ShengCai Liao, *Institute of Automation, Chinese Academy of Sciences, China*; Stan Li, *Institute of Automation, Chinese Academy of Sciences, China*

PS1.2. Face Liveness Detection Using 3D Structure Recovered from a Single Camera

Tao Wang, *Institute of Automation, Chinese Academy of Sciences, China*; Jianwei Yang, *Institute of Automation, Chinese Academy of Sciences, China*; Zhen Lei, *Institute of Automation, Chinese Academy of Sciences, China*; ShengCai Liao, *Institute of Automation, Chinese Academy of Sciences, China*; Stan Li, *Institute of Automation, Chinese Academy of Sciences, China*

PS1.3. Extended Clique Models: A New Matching Strategy for Fingerprint Recognition

Xiang Fu, *Peking University, China*; Chongjin Liu, *Peking University, China*; Junjie Bian, *Peking University, China*; Jufu Feng, *Peking University, China*; Han Wang, *Peking University, China*; Ziwei Mao, *Peking University, China*

PS1.4. Multi-scale Block Local Ternary Patterns for Fingerprints Vitality Detection

Xiaofei Jia, *Institute of Automation, Chinese Academy of Sciences, China*; Xin Yang, *Institute of Automation, Chinese Academy of Sciences, China*; Yali Zang, *Institute of Automation, Chinese Academy of Sciences, China*; Ning Zhang, *Institute of Automation, Chinese Academy of Sciences, China*; Ruwei Dai, *Institute of Automation, Chinese Academy of Sciences, China*; Jie Tian, *Institute of Automation, Chinese Academy of Sciences, China*; Jianmin Zhao, *Zhejiang Normal University, China*

PS1.5. Human Face Shape Analysis under Spherical Harmonics Illumination Considering Self Occlusion

Jasenko Zivanov, *University of Basel, Switzerland*; Andreas Forster, *University of Basel, Switzerland*; Sandro Schönborn, *University of Basel, Switzerland*; Thomas Vetter, *University of Basel, Switzerland*

PS1.6. Complementary Countermeasures for Detecting Scenic Face Spoofing Attacks

Jukka Komulainen, *University of Oulu, Finland*; André Anjos, *Idiap Research Institute, Switzerland*; Abdenour Hadid, *University of Oulu, Finland*; Sebastien Marcel, *Idiap Research Institute, Switzerland*; Matti Pietikainen, *University of Oulu, Finland*

PS1.7. Real-time High Performance Deformable Model for Face Detection in the Wild

Junjie Yan, *Institute of Automation, Chinese Academy of Sciences, China*; Xucong Zhang, *Institute of Automation, Chinese Academy of Sciences, China*; Zhen Lei, *Institute of Automation, Chinese Academy of Sciences, China*; Stan Li, *Institute of Automation, Chinese Academy of Sciences, China*

PS1.8. Towards Fingerprints as Strings: Secure Indexing for Fingerprint Matching

Jesse Hartloff, *University at Buffalo, USA*; Jimmy Dobler, *University at Buffalo, USA*; Sergey Tulyakov, *University at Buffalo, USA*; Atri Rudra, *University at Buffalo, USA*; Venu Govindaraju, *University at Buffalo, USA*

PS1.9. Haar-like Rectangular Features for Biometric Recognition

Kamal Nasrollahi, *Aalborg University, Denmark*; Thomas Moeslund, *Aalborg University, Denmark*; Maryam Rashidi, *Aalborg University, Denmark*

PS1.10. Complex Eye Movement Pattern Biometrics: Analyzing Fixations and Saccades

Corey Holland, *Texas State University, USA*; Oleg Komogortsev, *Texas State University, USA*

PS1.11. Automated Classification of Contact Lens Type in Iris Images

James Doyle, *University of Notre Dame, USA*; Patrick Flynn, *University of Notre Dame, USA*; Kevin Bowyer, *University of Notre Dame, USA*

PS1.12. Silhouette-Based Online Signature Verification Using Pen Tip Trajectory and Pen Holding Style

Daigo Muramatsu, *Osaka University, Japan*; Yasushi Yagi, *Osaka University, Japan*



PS1.13. Cancelable Iris-Templates using Key-dependent Wavelet Transforms

Jutta Hämmerle-Uhl, University of Salzburg, Austria; Elias Pschernig, University of Salzburg, Austria; Andreas Uhl, University of Salzburg, Austria

PS1.14. Hill-climbing attack: Parametric optimization and possible countermeasures. An application to on-line signature recognition

Emanuele Maiorana, University Roma Tre, Italy; Gabriel Emile Hine, University Roma Tre, Italy; Patrizio Campisi, University Roma Tre, Italy

PS1.15. A Robust Speed-Invariant Gait Recognition System for Walker and Runner Identification

Yu Guan, University of Warwick, UK; Chang-Tsun Li, University of Warwick, UK

PS1.16. A High Quality Finger Vascular Pattern Dataset Collected Using a Custom Designed Capturing Device

Bram Ton, University of Twente, The Netherlands; Raymond Veldhuis, University of Twente, The Netherlands



16:30–17:30 COMPETITIONS SESSION

Session Chair: Patrizio Campisi, University of Roma TRE, Italy

Competitions Chairs: Sébastien Marcel¹, Zhenan Sun²; ¹IDIAP, Switzerland; ²National Lab. of Pattern Rec., CASIA, China

CS.1. The 2013 Face Recognition Evaluation in Mobile Environment

M. Gunther¹, A. Costa-Pazo², C. Ding³, E. Boutellaa⁴, G. Chiachia⁵, H. Zhang⁶, M. de Assis Angeloni⁷, V. Struc⁸, E. Khoury⁹, E. Vazquez-Fernandez², D. Tao¹⁰, M. Bengherabi¹¹, D. Cox¹², S. Kiranyaz¹³, T. de Freitas Pereira¹⁴, J. Zganeç-Gros¹⁵, E. Argones-Rua¹⁶, N. Pinto¹⁷, M. Gabbouj¹⁸, F. Simoes¹⁹, S. Dobriska²⁰, D. Gonzalez-Jimenez²¹, A. Rocha²², M. Uliani Neto²³, N. Pavesic²⁴, A. Falcao²⁵, R. Violato²⁶, S. Marcel¹;

¹Idiap Research Institute, Switzerland, ²Galician Research and Development Center in Advanced Telecommunications, Spain, ³University of Technology Sydney, Australia, ⁴Centre de Developpement des Technologies Avancees, Algeria, ⁵University of Campinas, Brazil, ⁶Tampere University of Technology, Finland, ⁷CPqD Telecom & IT Solutions, Brazil, ⁸University of Ljubljana, Slovenia, ⁹Alpineon Ltd., Slovenia, ¹⁰Harvard University, USA

CS.2. The 2013 Speaker Recognition Evaluation in Mobile Environment

E. Khoury¹, B. Vesnicer², J. Franco-Pedroso³, R. Violato⁴, Z. Boulkenafet⁵, L.M. Mazaira Fernandez⁶, M. Diez⁷, J. Kosmala⁸, H. Khemiri⁹, T. Ciper¹⁰, R. Saeidi¹¹, M. Gunther¹², J. Zganeç-Gros¹³, R. Zazo Candil¹⁴, F. Simoes¹⁵, M. Bengherabi¹⁶, A. Alvarez Marquina¹⁷, M. Penagarikano¹⁸, A. Abad¹⁹, M. Boulayemen²⁰, P. Schwarz^{21,22}, D. Van Leeuwen²³, J. Gonzalez-Dominguez²⁴, M. Uliani Neto²⁵, E. Boutellaa²⁶, P. Gomez Vilda²⁷, A. Varona²⁸, D. Petrovska-Delacretaz²⁹, P. Matejka^{30,32}, J. Gonzalez-Rodriguez³¹, T. Pereira³², F. Harizi³³, L. J. Rodriguez-Fuentes³⁴, L. El Shafey³⁵, M. Angeloni³⁶, G. Borel³⁷, G. Chollet³⁸, S. Marcel¹;

¹Idiap Research Institute, Switzerland, ²Alpineon Ltd., Slovenia, ³Universidad Autonoma de Madrid, Spain, ⁴CPqD Telecom & IT Solutions, Brazil, ⁵Centre de Developpement des Technologies Avancees, Algeria, ⁶Universidad Politecnica de Madrid, Madrid, ⁷University of the Basque Country, Spain, ⁸L2F/INESC-ID, Portugal, ⁹Institut Mines-Telecom, France, ¹⁰Phonexia s.r.o., Czech Republic, ¹¹Radboud University Nijmegen, The Netherlands, ¹²Brno University of Technology, Czech Republic

CS.3. The 2nd Competition on Counter Measures to 2D Face Spoofing Attacks

I. Chingovska¹, J. Yang², Z. Lei³, D. Yi⁴, S. Z. Li⁵, O. Kahm⁶, C. Glaser⁷, N. Damer⁸, A. Kuijper⁹, A. Nouak¹⁰, J. Komulainen¹¹, T. Pereira^{12,16}, S. Gupta¹³, S. Khandelwal¹⁴, S. Bansal¹⁵, A. Rai¹⁷, T. Krishna¹⁸, D. Goyal¹⁹, M.-A. Waris²⁰, H. Zhang²¹, I. Ahmad²², S. Kiranyaz²³, M. Gabbouj²⁴, R. Tronci²⁵, M. Pili²⁶, N. Sirena²⁷, F. Roli²⁸, J. Galbally²⁹, J. Fierrez³⁰, A. Pinto³¹, H. Pedrin³², W. S. Schwartz³³, A. Rocha³⁴, A. Anjos³⁵, S. Marcel¹;

¹Idiap Research Institute, Switzerland, ²Chinese Academy of Sciences, China, ³Fraunhofer Institute for Computer Graphics Research IGD, Germany, ⁴University of Oulu, Finland, ⁵University of Campinas, Brazil, ⁶CPqD Telecom & IT Solutions, Brazil, ⁷The LNM Institute of Information Technology, India, ⁸Tampere University of Technology, Finland, ⁹University of Cagliari, Italy, ¹⁰Universidad Autonoma de Madrid, Spain, ¹¹Universidade Federal de Minas Gerais, Brazil

CS.4. LivDet 2013 - Fingerprint Liveness Detection Competition 2013

Luca Ghiani, University of Cagliari, Italy; David Yambay, Clarkson University, USA; Valerio Mura, University of Cagliari, Italy; Simona Tocco, University of Cagliari, Italy; Gian Luca Marcialis, University of Cagliari, Italy; Fabio Roli, University of Cagliari, Italy; Stephanie Schuckers, Clarkson University, USA

Thu, Jun 6

08:30–09:00 SPECIAL ORAL SESSION

Chair: Anil K. Jain, Michigan State University, USA

"ID for a Billion"

Ashok Pal Singh, Deputy Director General, Unique Identification Authority of India (UIDAI), India

09:00–10:00 KEYNOTE SPEAKER 2

Chair: Joaquin Gonzalez-Rodriguez, Universidad Autonoma de Madrid, Spain

"Forensic Science and Biometric Systems: an Impossible Mix?"

Christophe Champod, Institute of Forensic Science, University of Lausanne, Switzerland

Supported by COST Action IC-1106

10:30–11:50 ORAL SESSION 3: OCULAR BIOMETRICS

Chair: Maria De Marsico, University of Roma Sapienza, Italy

OS3.1. Alignment-Free Cancelable Iris Biometric Templates based on Adaptive Bloom Filters

Christian Rathgeb, Hochschule Darmstadt, Germany; Frank Breiteringer, Hochschule Darmstadt, Germany; Christoph Busch, Hochschule Darmstadt, Germany

OS3.2. Liveness Detection via Oculomotor Plant Characteristics: Attack of Mechanical Replicas

Oleg Komogortsev, Texas State University, USA; Alex Karpov, Texas State University, USA

OS3.3. A Feature-level Solution to Off-angle Iris Recognition

Xingguang Li, University of Science and Technology of China, China; Libin Wang, Institute of Automation, Chinese Academy of Sciences, China; Zhenan Sun, Institute of Automation, Chinese Academy of Sciences, China; Tieniu Tan, Institute of Automation, Chinese Academy of Sciences, China

OS3.4. Quality Factors Affecting Iris Segmentation and Matching

Fernando Alonso-Fernandez, Halmstad University, Sweden; Josef Bigun, Halmstad University, Sweden



13:45–15:05 ORAL SESSION 4: SOFT BIOMETRICS

Chair: Venu Govindaraju, University at Buffalo SUNY, USA

OS4.1. Multi-view Multi-modal Person Authentication from a Single Walking Image Sequence

Daigo Muramatsu, Osaka University, Japan; Haruyuki Iwama, Osaka University, Japan; Yasushi Makihara, Osaka University, Japan; Yasushi Yagi, Osaka University, Japan

OS4.2. Gender Classification Using Automatically Detected and Aligned 3D Ear Range Data

Jiajia Lei, Huazhong University of Science & Technology, China; Jindan Zhou, University Of Miami, USA; Mohamed Abdel-Mottaleb, University Of Miami, USA

OS4.3. Tattoo Based Identification: Sketch to Image Matching

Hu Han, Michigan State University, USA; Anil Jain, Michigan State University, USA

OS4.4. Age Estimation from Face Images: Human vs. Machine Performance

Hu Han, Michigan State University, USA; Charles Otto, Michigan State University, USA; Anil Jain, Michigan State University, USA



15:05–16:30 POSTER SESSION 2

Chairs: **Raymond Veldhuis¹**, **Karthik Nandakumar²**; ¹*University of Twente, The Netherlands*; ²*Inst. Infocomm Research, Singapore*

PS2.1. Local Salient Patterns - A Novel Local Descriptor for Face Recognition

Zhenhua Chai, *Institute of Automation, Chinese Academy of Sciences, China*; Zhenan Sun, *Institute of Automation, Chinese Academy of Sciences, China*; Tieniu Tan, *Institute of Automation, Chinese Academy of Sciences, China*; Heydi Mendez-Vazquez, *Advanced Technologies Application Center (CENATAV), Cuba*

PS2.2. A Hierarchical Registration Algorithm for Fingerprints from Multi-type Capture Sensors

Yali Zang, *Institute of Automation, Chinese Academy of Sciences, China*; Xin Yang, *Institute of Automation, Chinese Academy of Sciences, China*; Xiaofei Jia, *Institute of Automation, Chinese Academy of Sciences, China*; Ning Zhang, *Institute of Automation, Chinese Academy of Sciences, China*; Jie Tian, *Institute of Automation, Chinese Academy of Sciences, China*; XinZhong Zhu, *Zhejiang Normal University, China*

PS2.3. A Coarse-fine Fingerprint Scaling Method

Yali Zang, *Institute of Automation, Chinese Academy of Sciences, China*; Xin Yang, *Institute of Automation, Chinese Academy of Sciences, China*; Xiaofei Jia, *Institute of Automation, Chinese Academy of Sciences, China*; Ning Zhang, *Institute of Automation, Chinese Academy of Sciences, China*; Jie Tian, *Institute of Automation, Chinese Academy of Sciences, China*; XinZhong Zhu, *Zhejiang Normal University, China*

PS2.4. SIFT-based Image Alignment for Contactless Palmprint Verification

Qiushi Zhao, *Harbin Institute of Technology, China*; Wei Bu, *Harbin Institute of Technology, China*; Xiangqian Wu, *Harbin Institute of Technology, China*

PS2.5. Sketch Based Face Recognition: Forensic vs. Composite Sketches

Scott Klum, *Michigan State University, USA*; Hu Han, *Michigan State University, USA*; Anil Jain, *Michigan State University, USA*; Brendan Klare, *Noblis, USA*

PS2.6. Automatic Facial Makeup Detection with Application in Face Recognition

Cunjian Chen, *West Virginia University, USA*; Antitza Dantcheva, *Michigan State University, USA*; Arun Ross, *Michigan State University, USA*

PS2.7. Bits Extraction for Palmprint Template Protection with Gabor Magnitude and Multi-bit Quantization

Meiru Mu, *University of Twente, The Netherlands*; Qiuqi Ruan, *Beijing Jiaotong University, China*; Xiaoying Shao, *University of Twente, The Netherlands*; Luuk Spreeuwiers, *University of Twente, The Netherlands*; Raymond Veldhuis, *University of Twente, The Netherlands*

PS2.8. A Facial Symmetry Prior for Improved Illumination Fitting of 3D Morphable Model

Guosheng Hu, *University of Surrey, UK*; Pouriya Mortazavian, *University of Surrey, UK*; Josef Kittler, *University of Surrey, UK*; William Christmas, *University of Surrey, UK*

PS2.9. Practical Identification with Encrypted Biometric Data Using Oblivious RAM

Julien Bringer, *Morpho, France*; Hervé Chabanne, *Mopho, Télécom ParisTech, France*; Alain Patey, *Morpho, Télécom ParisTech, France*

PS2.10. Limbus Impact on Off-angle Iris Degradation

Mahmut Karakaya, *Oak Ridge National Laboratory, USA*; Del Barstow, *Oak Ridge National Laboratory, USA*; Hector Santos-Villalobos, *Oak Ridge National Laboratory, USA*; Joseph Thompson, *Oak Ridge National Laboratory, USA*; David Bolme, *Oak Ridge National Laboratory, USA*; Chris Boehnen, *Oak Ridge National Laboratory, USA*

PS2.11. Revisiting Iris Recognition with Color Cosmetic Contact Lenses

Naman Kohli, *Indraprastha Institute of Information Technology Delhi, India*; Daksha Yadav, *Indraprastha Institute of Information Technology Delhi, India*; Mayank Vatsa, *Indraprastha Institute of Information Technology Delhi, India*; Richa Singh, *Indraprastha Institute of Information Technology Delhi, India*

PS2.12. The Impact of Diffuse Illumination on Iris Recognition

Amanda Sgroi, *University of Notre Dame, USA*; Kevin Bowyer, *University of Notre Dame, USA*; Patrick Flynn, *University of Notre Dame, USA*

PS2.13. Biometric Verification Based on Hand Thermal Images

Adam Czajka, *NASK, Warsaw University of Technology, Poland*; Paweł Bulwan, *Warsaw University of Technology, Poland*

PS2.14. Deformed Iris Recognition Using Bandpass Geometric Features and Lowpass Ordinal Features

Man Zhang, *Institute of Automation, Chinese Academy of Sciences, China*; Zhenan Sun, *Institute of Automation, Chinese Academy of Sciences, China*; Tieniu Tan, *Institute of Automation, Chinese Academy of Sciences, China*

PS2.15. Offline Text-independent Writer Identification Using Stroke Fragment and Contour Based Features

Youbao Tang, *Harbin Institute of Technology, China*; Xiangqian Wu, *Harbin Institute of Technology, China*; Wei Bu, *Harbin Institute of Technology, China*

PS2.16. Predict and Improve Iris Recognition Performance Based on Pairwise Image Quality Assessment

Xingguang Li, *University of Science and Technology of China, China*; Zhenan Sun, *Institute of Automation, Chinese Academy of Sciences, China*; Tieniu Tan, *Institute of Automation, Chinese Academy of Sciences, China*

16:30–17:30 PANEL DISCUSSION

"Integrating Biometrics and Forensic Science for the Digital Age: A New Research Agenda"

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

Panelists: **Christophe Champod¹**, **Brendan Klare²**, **Mark Nixon³**, **Tieniu Tan⁴**; ¹*Institute of Forensic Science, University of Lausanne, Switzerland*; ²*Noblis, USA*; ³*University of Southampton, UK*; ⁴*Center for Research on Intelligent Perception and Computing, CASIA, China*

Supported by COST Action IC-1106

Fri, Jun 7

09:00–10:00 KEYNOTE SPEAKER 3

Chair: **Tieniu Tan**, *Center for Research on Intelligent Perception and Computing, CASIA, China*

"Biometric Research: From the Lab to Large Scale Deployment"

Jean-Christophe Fondeur, *VP, Research & Technology at Morpho, France*

10:30–11:50 ORAL SESSION 5: FINGERPRINT AND SECURITY

Chair: **Christoph Busch**, *Gjøvik University College, Norway*

OS5.1. Fingerprint Quality Assessment Using Frequency and Orientation Subbands of Block-based Fourier Transform

Krisada Phromsuthirak, *Kasetsart University, Thailand*; Vutipong Areekul, *Kasetsart University, Thailand*

OS5.2. A Feedback Paradigm for Latent Fingerprint Matching

Eryun Liu, *Michigan State University, USA*; Sunpreet Arora, *Michigan State University, USA*; Kai Cao, *Michigan State University, USA*; Anil Jain, *Michigan State University, USA*

OS5.3. Poisoning Attacks to Compromise Face Templates

Battista Biggio, *University of Cagliari, Italy*; Luca Didaci, *University of Cagliari, Italy*; Giorgio Fumera, *University of Cagliari, Italy*; Fabio Roli, *University of Cagliari, Italy*

OS5.4. BioSAKE: Biometrics-based Secure Authentication and Key Exchange

Karthik Nandakumar, *Institute for Infocomm Research, Singapore*

13:45–15:05 ORAL SESSION 6: FACE ACQUISITION AND ANALYSIS

Chair: **Stan Z. Li**, *Center for Biometrics and Security Research, CASIA, China*

OS6.1. CS-3DLBP and Geometry based Person Independent 3D Facial Action Unit Detection

Neslihan Bayramoglu, *University of Oulu, Finland*; Guoying Zhao, *University of Oulu, Finland*; Matti Pietikainen, *University of Oulu, Finland*

OS6.2. A New Perspective - Face Recognition with Light-Field Camera

R. Raghavendra, *Gjøvik University College, Norway*; Bian Yang, *Gjøvik University College, Norway*; Kiran B Raja, *Gjøvik University College, Norway*; Christoph Busch, *Gjøvik University College, Norway*

OS6.3. Can Face Anti-Spoofing Countermeasures Work in a Real World Scenario?

Tiago De Freitas Pereira, *Universidade Estadual de Campinas & CPqD Telecom & IT Solutions, Brazil*; André Anjos, *Idiap Research Institute, Switzerland*; José Mario De Martino, *Universidade Estadual de Campinas, Brazil*; Sébastien Marcel, *Idiap Research Institute, Switzerland*

OS6.4. Generating Face Images under Multiple Illuminations Based on a Single Front-lighted Sample without 3D Models

Qiang Jia, *Tsinghua University, China*; Chi Fang, *Tsinghua University, China*; Di Wen, *Tsinghua University, China*; Xiaoqing Ding, *Tsinghua University, China*

15:05–16:30 POSTER SESSION 3

Chairs: Carmen Garcia-Mateo¹, Brendan Klare²; ¹University of Vigo, Spain; ²Noblis, USA

PS3.1. Face Liveness Detection using Variable Focusing

Sooyeon Kim, *Yonsei University, Republic of Korea*; Sunjin Yu, *Cheju Halla University, Republic of Korea*; Kwangtaek Kim, *Microsoft Research Asia, China*; Yuseok Ban, *Yonsei University, Republic of Korea*; Sangyoun Lee, *Yonsei University, Republic of Korea*

PS3.2. Evaluation of Minutia Cylinder-Code on Fingerprint Cross-matching and Its Improvement with Scale

Yali Zang, *Institute of Automation, Chinese Academy of Sciences, China*; Xin Yang, *Institute of Automation, Chinese Academy of Sciences, China*; Xiaofei Jia, *Institute of Automation, Chinese Academy of Sciences, China*; Ning Zhang, *Institute of Automation, Chinese Academy of Sciences, China*; Jie Tian, *Institute of Automation, Chinese Academy of Sciences, China*; Jianmin Zhao, *Zhejiang Normal University, China*

PS3.3. Improving Faces/Non-Faces Discrimination in Video Sequences by Using a Local Spatio-Temporal Representation

Yoanna Martinez-Diaz, *Advanced Technologies Application Center (CENATAV), Cuba*; Heydi Mendez-Vazquez, *Advanced Technologies Application Center (CENATAV), Cuba*; Noslen Hernández, *Advanced Technologies Application Center (CENATAV), Cuba*; Edel Garcia-Reyes, *Advanced Technologies Application Center (CENATAV), Cuba*

PS3.4. Performance Improvement of Face Recognition Algorithms Using Occluded-Region Detection

Yuichiro Tajima, *Tohoku University, Japan*; Koichi Ito, *Tohoku University, Japan*; Takafumi Aoki, *Tohoku University, Japan*; Tomoki Hosoi, *Azbil Corporation, Japan*; Sei Nagashima, *Azbil Corporation, Japan*; Koji Kobayashi, *Azbil Corporation, Japan*

PS3.5. Construction of Dictionaries to Reconstruct High-Resolution Images for Face Recognition

Nadia AL-Hassan, *University of Buckingham, UK*; Sabah Jassim, *University of Buckingham, UK*; Harin Sellahewa, *University of Buckingham, UK*

PS3.6. Disguise Detection and Face Recognition in Visible and Thermal Spectrums

Tejas Dhamecha, *Indraprastha Institute of Information Technology Delhi, India*; Aastha Nigam, *Indraprastha Institute of Information Technology Delhi, India*; Richa Singh, *Indraprastha Institute of Information Technology Delhi, India*; Mayank Vatsa, *Indraprastha Institute of Information Technology Delhi, India*

PS3.7. A Generative Model for Fingerprint Minutiae

Qijun Zhao, *Sichuan University, China*; Anil Jain, *Michigan State University, USA*; Nicholas Paulter, *National Institute of Standards and Technology, USA*; Melissa Taylor, *National Institute of Standards and Technology, USA*; Yi Zhang, *Sichuan University, China*

PS3.8. Is There a Fingerprint Pattern in the Image?

Soweon Yoon, *Michigan State University, USA*; Anil Jain, *Michigan State University, USA*

PS3.9. Biometric System Design under Zero and Non-Zero-Effort Attacks

Ajita Rattani, *University of Cagliari, Italy*; Norman Poh, *University of Surrey, UK*

PS3.10. Vein Minutia Cylinder-Codes (V-MCC)

Daniel Hartung, *Gjøvik University College, Norway*; Massimo Tistarelli, *University of Sassari, Italy*; Christoph Busch, *Gjøvik University College, Norway*

PS3.11. Secure Hamming Distance based Biometric Authentication

Rohan Kulkarni, *International Institute of Information Technology Hyderabad, India*; Anoop Namboodiri, *International Institute of Information Technology Hyderabad, India*

PS3.12. The Prediction of Old and Young Subjects from Iris Texture

Amanda Sgroi, *University of Notre Dame, USA*; Kevin Bowyer, *University of Notre Dame, USA*; Patrick Flynn, *University of Notre Dame, USA*

PS3.13. Assessment of the Quality of Handwritten Signatures Based on Multiple Correlations

Richard Guest, *University of Kent, UK*; Olaf Henniger, *Fraunhofer-Institut für Graphische Datenverarbeitung IGD, Germany*

PS3.14. A Novel Approach of Gait Recognition Through Fusion with Footstep Information

Ruben Vera-Rodriguez, *Universidad Autonoma de Madrid, Spain*; Julian Fierrez, *Universidad Autonoma de Madrid, Spain*; John Mason, *Swansea University, UK*; Javier Ortega-Garcia, *Universidad Autonoma de Madrid, Spain*

PS3.15. Perceptions of Interfaces for Eye Movement Biometrics

Michael Brooks, *University of Washington, USA*; Cecilia Aragon, *University of Washington, USA*; Oleg Komogortsev, *Texas State University, USA*

PS3.16. Variations of Handwritten Signatures with Time: A Sigma-Lognormal Analysis

Marta Gomez-Barrero, *Universidad Autonoma de Madrid, Spain*; Javier Galbally, *Universidad Autonoma de Madrid, Spain*; Rejean Plamondon, *Ecole Polytechnique de Montreal, Canada*; Julian Fierrez, *Universidad Autonoma de Madrid, Spain*; Javier Ortega-Garcia, *Universidad Autonoma de Madrid, Spain*

16:30–17:45 AWARDS – CLOSING CEREMONY

Chairs: Tieniu Tan¹ (Awards), Javier Ortega-Garcia² (Closing Ceremony); ¹Center for Research on Intelligent Perception and Computing, CASIA, China; ²Universidad Autonoma de Madrid, Spain

