



CONFERENCE GUIDE



# EAB RPC 2019

EAB Research Projects Conference

Darmstadt, Germany,  
16-18 September 2019

The leading voice for digital ID & biometrics, in Europe

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## Foreword from DG HOME European Commission



Joint Research Centre (DG JRC) in order to develop the best possible European policies, based on scientific evidence, in the vital fields of migration and security, that will help citizens to have a brighter, better and safer future. This collaboration with JRC is strongly rooted in the experience gained during the successful development of the biometric part of current European large-scale IT systems (Schengen Information System, Eurodac, Visa Information System), their evolution and the preparation of the new ones (Entry Exit System, shared Biometric Matching System).

In this context, we fully support the organisation of events focused on security technologies such as biometrics, that can benefit Europe's policy-making in all the key areas mentioned above. The Commission supports the majority of the projects presented in this conference via the EU Horizon 2020 Secure Societies programme, which is managed by DG HOME.

We clearly see the EAB Research Projects Conference as a forum that can have a significant contribution to the improvement of Europe's welfare.

Matthias Oel

Director, Directorate B  
"Migration, Mobility and Innovation",  
DG HOME - European Commission

Some of the key points clearly set forth in the European Union's agenda to reach a more secure society include: fight against crime, fight against illegal trafficking and terrorism, strengthening security through better border management, providing cybersecurity or enhancing the standardisation and interoperability of systems.

The Directorate General of Migration and Home Affairs (DG HOME) is in charge of developing the policy related to all the previous areas, in order to build a safer Europe both by better managing migration and by fighting crime within EU's frontiers. To reach this overall objective DG HOME has as priorities the promotion of cooperation among law enforcers, border management, civil protection and disaster management.

At DG HOME as a whole, and in particular in Directorate B for "Migration, Mobility and Innovation", we are firmly convinced that technology and research will be fundamental cornerstones to successfully reach the ambitious objectives laid out in this overall security agenda. Therefore, DG HOME works closely with DG

## Foreword from DG JRC European Commission



Directorate General Joint Research Centre (DG JRC) is the European Commission's science and knowledge service. The main mandate of DG JRC is not only to create knowledge through research but also to manage and interpret knowledge produced elsewhere, to support European policies with independence evidence. It is also a responsibility of DG JRC to anticipate emerging issues that need to be addressed at EU level and also to help sharing know-how with EU countries, the scientific community and international partners.

One of the main priorities at DG JRC, managed from Directorate E for "Space, Security and Migration", is to strengthen the citizens' security and to improve European border management both for European citizens and third country nationals. This work is done in close collaboration with the DG of Migration and Home Affairs (DG HOME) in order to provide them with strong scientific support in the policy making process. Without a doubt, biometric technology will play a key role in the years to come in order to successfully reach the objectives set above.

For these reasons, as Director of Directorate E at DG JRC, I am convinced that events such as the EAB Research Projects Conference are a fundamental part of EU's policy development within the fields of security and migration. I would like to express my full support to the initiative, hoping that all participants will help to build a better future for Europe.

Dan Chirondojan

Director, Directorate E  
"Space, Security and Migration",  
DG JRC - European Commission

## From the EAB Chairman



### Alexander Nouak

#### Chairman EAB

Since 2014 we have been inviting projects from the European Commission's research funding programmes year after year, which are also dedicated to the automated recognition of individuals on the basis of their body characteristics or their behaviour, i.e. biometrics. We are therefore proud to present the 6th edition of this conference to you this year. In this way, we bring developers in this field together with the community in biometrics and interested parties and thus achieve a win-win-win situation: the project operators receive the attention they need for the confirmation of their developments; those interested in biometrics get the opportunity to find out in which developments the European Commission is investing and can review and discuss critical solutions; and last but not least, the European Association for Biometrics EAB gets the opportunity to bring the community together and, if necessary, to address potential new members.

So, if this is your first year at the conference, I would like to briefly introduce EAB to you. Our role is to be the leading voice for biometrics and digital ID in Europe. As a non-profit, impartial association, we ultimately serve the citizens of Europe to improve their lives and drive economic growth. EAB actively encourages cooperation between our members, whether it be exchanging advice and expertise, presenting best practices and new innovations, or simply moderating new ideas... as you will see in the days to come.

Although we focus on the European agenda, the European Association for Biometrics is also actively involved in global campaigns and concerns that promote the acceptance and responsible use of modern digital ID systems. In this context, we support SDG 16.9 (Legal Identity for all), which demands 16 September as International ID Day.

If you are interested in becoming a member of the EAB, please send an e-mail to: [secretariat@eab.org](mailto:secretariat@eab.org) or visit our website at <https://www.eab.org>. There you will also find our application form along with other valuable information associated with membership.

All I have left is to wish you an exciting (and stimulating) conference and I look forward to meeting many of you in the coming days.

Alexander Nouak  
Chairman EAB.

## From the conference chair



### Dr. Javier Galbally

#### Conference-chair EAB-RPC

Dear participants,

as Chair of the conference, on behalf of the whole organising committee, it is my pleasure to welcome you to the 6th Edition of the EAB Research Projects Conference 2019, organised by the European Association for Biometrics (EAB) in cooperation with DG Joint Research Centre of the European Commission and Fraunhofer IGD.

The conference was born already five years ago with the aim of providing a common platform to European funded projects in the field of biometrics to disseminate their results and to present the latest developments in this thriving technology. I think that it is safe to say that, since its creation to this 6th edition, the conference has gone a long way and has quite brilliantly achieved its original goal, consolidating itself as one of the yearly main research events in Europe in biometrics.

Furthermore, the conference has become a meeting venue not only for researchers, but also for all other parties involved in the development of biometrics, including vendors, developers and policy makers. We are proud to say that many of the participants from previous editions have praised the event due to its unique environment, which has allowed them to better understand the needs and points of view of other organizations, providing them the opportunity to enlarge their network and to find new partners for future projects.

This year's edition features the participation of 21 European Projects, three keynote speeches, a demo session and a round table on the topic of "operational needs meets research". On the opening keynote speech, Richard Rinkens from DG HOME will update us on the latest developments on large European IT systems, the use of biometrics within them and the strategies for their interoperability. On the closing keynote speech, the Deputy Head of Unit of Unit B.4 in DG HOME "Innovation and Industry for Security" will talk about security research and its key role in the forthcoming Horizon Europe.

The organising team has worked hard to deliver to you the best possible event, which we hope you find informative and helpful for your future research endeavours. Hopefully, all together we can make the future of biometrics even a brighter one.

Welcome!

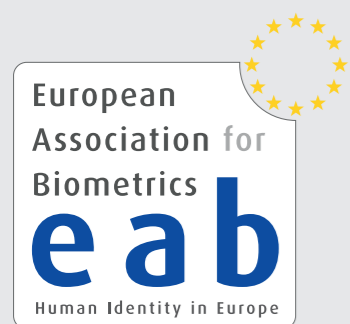
Javier Galbally  
Chair of EAB-RPC

# The Organizing Committee

- **Conference Chair**
  - Dr. Javier Galbally,  
*European Commission DG-JRC*
- **Round Table Chairs**
  - Prof. Dr. Farzin Deravi,  
*EAB Deputy Chairman of the Board*
  - Dinusha Frings,  
*Dutch National Office for Identity Data*
- **Demo and Posters Chair**
  - Dr. Fernando Alonso-Fernandez,  
*Halmstad University*
- **Publicity and Local Committee Chair**
  - Alexander Nouak,  
*EAB Chairman*
- **Local Committee Co-Chair**
  - Prof. Dr. Christoph Busch,  
*EAB Board member*

## Our partners and Sponsors

The EAB-RPC conference is organized by The European Association for Biometrics (EAB) in cooperation with the Joint Research Center (DG-JRC) of the European Commission.



We kindly thank our sponsor for supporting the EAB-RPC conference



## Monday, September 16

Room 074		Session: Opening				
Start	End	Monday, September 16				
16:00	16:05	01-1	Alexander Nouak	EAB	Conference Opening	
16:05	16:15	01-2	Jean Salomon	EAB	EAB-RPC: Backprojecting into the future	
16:15	16:30	01-3	Javier Galbally	EC DG-JRC	Biometric research at DG JRC	

Room 074		Session: Keynote I				
Start	End	Monday, September 16		Chair: Javier Galbally		
16:40	17:30	02-1	Richard Rinkens	EC DG HOME	Implications of the Interoperability Regulations	

Room 074		Session just started ITNs: RHUMBO, TRESPASS, PRIMA, H-Unique				
Start	End	Monday, September 16		Chair: Javier Galbally		
17:30	17:50	03-1	Mariano Alcañiz	UPV	RHUMBO: modelling and predicting Human decision-making Using Measures of subconscious Brain processes through mixed reality interfaces and biometric signals	
17:50	18:10	03-2	Raymond Veldhuis	Utwente	The PRIMA project	
18:10	18:30	03-3	Massimiliano Todisco	EURECOM	An introduction to the TReSPAsS-ETN project	
18:30	18:50	03-1	Sue Black	Lancaster University	An introduction to the H-Unique project processes through mixed reality interfaces and biometric signals	

18:50 21:00 Dinner: EAB-RPC

## Tuesday, September 17

Room 074		Session finished projects I: PROTECT				
Start	End	Tuesday, September 17		Chair: James Ferryman, Assistant: Javier Galbally		
09:00	09:25	04-1	Susanne Kraenkl	VERIDOS	Demonstration outcomes	
09:25	09:55	04-2	Simon Kirchgasser	University of Salzburg	PROTECT biometric innovations	
09:55	10:15	04-3	James Ferryman	University of Reading	Lessons Learnt and Recommendations	

10:15 10:45 Communication Break + POSTERS

Room 074		Session finished projects II: BODEGA, LIGHTest, SpeechXRays				
Start	End	Tuesday, September 17		Chair: Alexander Nouak		
10:45	11:05	05-1	Sirra Toivonen	VTT	The BODEGA project- Proactive Enhancement of Human Performance in Border Control	
11:05	11:25	05-2	Heiko Roßnagel	Fraunhofer IAO	Wrap-up of the LIGHTest project	
11:25	11:45	05-3	Dijana Petrovska, Claude Bauzou	Telecom Sudparis, IDEMIA	SpeechXRays H2020 project: lessons learned from testing a multi-biometric solution in real-life conditions for three use cases with 2000 users	

11:45 12:15 Communication Break + POSTERS

Room 074		On-going projects I: SMILE, FOLDOUT				
Start	End	Tuesday, September 17		Chair: Javier Galbally		
12:15	12:45	06-1	Georgios Stavropoulos	Inf. Tech. Institute Centre of Research & Technology	TSMILE Project: Overview and progress	
12:45	13:15	06-2	Maj Grzegorz Kostecki	Polish Border Guard	FOLDOUT: Current status	

13:15 14:15 Lunch Break + POSTERS

Room 074		On-going projects II: TRESSPASS, SWAN, PYCSEL				
Start	End	Tuesday, September 17		Chair: Javier Galbally		
14:15	14:45	07-1	Dimitrios M. Kyriazanos	DEMOKRITOS	UTRESSPASS: developments in risk based BCP security	
14:45	15:15	07-2	Raghavendra Ramachandra	NTNU	Secure Access Control Over Wide Area Network (SWAN)	
15:15	15:45	07-3	Jean-François Mainguet, Marina Pouet	CEA, IDEMIA	PYCSEL, a new flexible active thermal fingerprint sensor: hot image results	

15:45 16:15 Communication Break + POSTERS

## Tuesday, September 17

Room 074 SME projects: Stellar i-ris, QUARDCARD					
Start	End	Tuesday, September 17		Chair: Fernando Alonso	
16:15	16:45	08-1	Johannes Junggeburth	STELLAR	The STELLAR I-RIS project
16:45	17:15	08-2	Frank Sandelov	CARDLAB	QuardCard, unique identification and full privacy protection for your digital and Cyber life

Hall Demo session: STELLAR I-RIS, QUARDCARD, SMART-TRUST, SOTAMD, PYCSEL, SWAN, LIGHTest					
Start	End	Tuesday, September 17		Chair: Fernando Alonso	
17:15	18:45	9-1			

17:30	19:30	EAB GENERAL ASSEMBLY			
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## Wednesday, September 18

Room 074 Session: Keynote II					
Start	End	Wednesday, September 18		Chair: Javier Galbally	
09:00	09:50	10-1	Andrea de Candido	EC DG HOME	Security research: a strategic tool for capability development
09:50	10:20	Communication Break + POSTERS			

Room 074 PARALLEL session on-going projects I: SOTAMD					
Start	End	Wednesday, September 18		Chair: Dinusha Frings	
10:20	10:50	11-1	Dinusha Frings	Dutch National office for Identity Data	State of the art of morphing detection (SOTAMD)
10:50	11:10	11-2	Luuk Spreeuwers	University of Twente	STOAMD: Morphing process
11:10	11:30	11-3	Kiran Raja	Norges Teknisk-Naturvitenskapelige Universitet	SOTAMD: Morphing detection methods
11:30	11:50	11-4	Annalisa Franco	University of Bologna	SOTAMD: The morphing attack detection benchmark

## Wednesday, September 18

Room 073 PARALLEL session on-going projects II: AMBER					
Start	End	Wednesday, September 18		Chair: Richard Guest	
10:20	10:50	12-1	Richard Guest	University of Kent	AMBER: enhanced Mobile BioMetrics, A Marie Skłodowska-Curie Innovative Training Network
10:50	11:10	12-2	Ellakiya Ellavarason	University of Kent	Performance Evaluation of Swipe Gestures Across Usage Scenarios of Mobile Devices
11:10	11:30	12-3	Salatiel Ezennaya	University of Magdeburg	Privacy management, Regulations and Automated Consent in the Era of Mobile Biometrics
11:30	11:50	12-4	Anas Husseis	Universidad Carlos III Madrid	Vulnerability assessment in the use of biometrics in unsupervised environments

11:50	12:50	Lunch Break + POSTERS			
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Room 074 Session just started projects: PERSONA, D4FLY, RESPECT					
Start	End	Wednesday, September 18		Chair: Javier Galbally	
12:50	13:10	13-1	Dariusz Kloza, Simone Casiraghi	VUB	Towards a comprehensive method for impact assessment of no-gate crossing technologies at European borders
13:10	13:30	13-2	Dimitrios Kyriazanos, Armin Reuter	DEMOKRITOS, VERIDOS	An introduction to the D4FLY project
13:30	13:50	13-3	Marta Gomez-Barrero, Antitza Dantcheva	Hochschule Darmstadt, INRIA	RESPECT: REliable, Secure and Privacy preserving multi-biometric pErson authentiCaTion
13:50	14:20	Communication Break + POSTERS			

Room 074 Round table: Operational needs meet research					
Start	End	Wednesday, September 18		Chair: Farzin Deravi	
14:20	15:10	14-1	Frøy Løvåsdal, Jakob Dam Glynstrup, Lena Klasén		

Room 074 Session: Closing					
Start	End	Wednesday, September 18			
15:10	15:15	15-1	Alexander Nouak, Javier Galbally	EAB, DG JRC	Conference Closing

16:00	18:30	EAB Award Presentations			
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19:00	21:00	Reception dinner: EAB-RPC meets BIOSIG + EAB Award Ceremony			
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# Speakers

## Speakers at a glance

### Keynote speakers

- Richard Rinkens EC DG HOME
- Andrea de Candido EC DG HOME

### Conference chairs

- Alexander Nouak EAB (Chairman)
- Jean Salomon EAB (Chief Executive)
- Javier Galbally European Commission (DG-JRC)
- Dr. Fernando Alonso-Fernandez Halmstad University
- Farzin Deravi University of Kent
- Dinusha Frings Dutch National office for Identity Data

### Round table discussion: Operational needs meet research

- Jakob Dam Glynstrup Danish National ID Centre
- Lena Klasén Swedish Police Authority
- Frøy Løvåsdal Norwegian National Police ID Directorate

## Richard Rinkens



After implementing the Biometric Matching System (BMS) for the Visa Information System (VIS), he worked on a variety of strategic ideas and concepts involving biometrics and identity management such as the Smart Borders initiative, the SIS AFIS, the Schengen Masterlist, EES and ETIAS. He was

involved in the Interoperability programme from the start. Richard has an academic background in electronics, informatics and artificial intelligence.

## Andrea de Candido



Mr Andrea DE CANDIDO works for the Directorate General for Migration and Home Affairs of the European Commission where he is the Acting Head of the "Innovation and Industry for Security" Unit which deals with Security Research and Industrial Policy. Among the responsibilities of the Unit is the elaboration of the Secure Societies part of the European Union Research &

Innovation Framework Programme that enables cross border funding of research projects in the security dimension. Before joining DG HOME Mr De Candido had been briefly working for the Research & Innovation Directorate General of the European Commission and, before that, had spent 25 years in the Italian Army from which he retired in 2013 with the rank of Lt. Colonel.

## Alexander Nouak

EAB Chairman

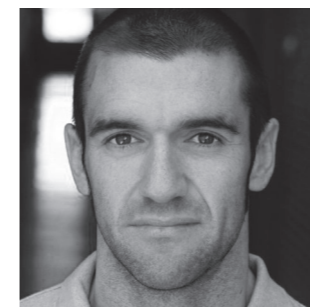


Alexander Nouak is co-founder and chairman of the EAB and since 2016, managing director of the Fraunhofer ICT Group, a service provider and partner for the 21 Fraunhofer Institutes. Earlier, Alexander was head of the CompetenceCenter „Identification and Biometrics“ at the Fraunhofer Institute for Computer Graphics Research IGD in Darmstadt, Germany for a period of 11 years. He was responsible for the acquisition, the management, and the controlling of various applied research and development projects. His department staff consisted of up to ten scientists in addition

to several guest researchers and student research associates. Alexander Nouak was an active member of the DIN NIA 37 working group on biometrics as well as a contributor to the WG5 on „Biometric testing and reporting“ of ISO/IEC JTC1 SC37. Since 2009, Alexander Nouak is a certified Common Criteria Evaluator (CC 3.1) and a member of IEEE. As a member of the Gesellschaft für Informatik (GI) he participates in the steering committee of the special group BIOSIG and he chairs the Biometrics Working Group of TeleTrust as a deputy.

## Dr. Javier Galbally

Conference chair



Javier Galbally received the M.Sc. degree in Electrical Engineering from the Universidad de Cantabria, Spain, in 2005, and the Ph.D. degree in Electrical Engineering from the Universidad Autónoma de Madrid, Spain, in 2009, where he was an Assistant Professor until 2012. In 2013, he joined the European Commission in DG Joint Research Centre, where he is currently a Scientific/Technical Officer. His research interests are mainly focused on the security and performance evaluation of biometric systems, pattern and biometric recognition. He is actively involved in different

European projects dealing with biometrics and their use in large IT systems. He has authored over 100 publications mainly focused on the biometrics field. He has also been the recipient of a number of distinctions, including the IBM Best Student Paper Award at ICPR 2008, finalist of the EBF European Biometric Research Award 2009, Best Ph.D. Thesis Award by the Universidad Autónoma de Madrid 2010, Best Poster Award at ICB 2013, Best Paper Award at ICB 2015 and Best Poster Award at IJCB 2018. He is the Chair of the EAB Research Project Conference since 2017.

## Jean Salomon

EAB CEO



Jean SALOMON joined IBM France after his Ph.D, and devoted 10 years to Medical Imaging, both in clinical R&D and Product Management overseas.

He spent part of his career years with IER, a world leader in the Transportation Industry equipment manufacturing, enhancing and securing passenger and goods flows across airports, with special emphasis on border management processes, software and technologies.

Since 2008 Jean is the Principal of JSCP, a consulting practice solely dedicated to Travel and Border Security, reassessing emerging Digital Identity Management processes.

As ISO expert, he is an active member of ICAO's NTWG and ICBWG, focusing on ID- and IT-related components of Integrated Border Management Systems, including harmonization of Biometrics and breeder documents (WG3, TC224/WG18-WG19).

Jean took part in several ICAO field assessment missions on Civil Registration in Africa. He was Co-chair of the Advisory Board of the E.U. FIDELITY Project, and a reviewer of several FP7 and H2020 projects. He is a frequent speaker and moderator in large international Transportation Industry Security and Facilitation fora.

In May 2019 Jean became the CEO of EAB, the European Association for Biometrics.

## Dr. Fernando Alonso-Fernandez

Demos Chair



Fernando Alonso-Fernandez received the M.S. and Ph.D. degrees in telecommunications engineering from the Universidad Politecnica de Madrid, Spain, in 2003 and 2008, respectively. Since 2010, he has been with the Centre for Applied Intelligent Systems Research, Halmstad University, Sweden, first as a recipient of a Marie Curie IEF and a Post-Doctoral Fellowship from the Swedish Research Council, and later as a recipient of a Project Research Grant for Junior Researchers of the Swedish Research Council. Since 2017, he has been an Associate Professor with Halmstad University. He has been actively involved in multiple EU (such as FP6 Biosecure NoE and COST IC1106) and national projects (such as SIDUS- AIR

and CAISR) focused on biometrics and human-machine interaction. He has carried out research internships in several laboratories and companies in Italy, Malta, Norway, France, UK and The Netherlands. He has over 70 international contributions at refereed conferences and journals, and has authored several book chapters. His research interests include signal and image processing, pattern recognition, and biometrics, with emphasis on facial cues and body biosignals. He Co-Chaired ICB2016, the 9th IAPR International Conference on Biometrics. Since 2018, he has been an Associate Editor of the IET Biometrics journal and the IEEE Biometrics Council Newsletter.

## Prof. Dr. Farzin Deravi

Round table Chair



Farzin Deravi is with the School of Engineering and Digital Arts at the University of Kent where he is the Professor of Information Engineering. His current research interests include pattern recognition and signal processing with applications in security and healthcare. He was the founding chair of the IET Professional Network on Visual Information Engineering and is

currently Editor-in-Chief of the IET Image Processing journal. He is the Deputy Chair of the European Association for Biometrics's Management Board and the Vice President of the BioSecure Association. He also serves on BSI and ISO committees on biometric standardisation.

## Dinusha Frings

Round table Co-Chair



Dinusha Frings manages national and international research projects for the National Office for Identity Data (NOID). NOID is part of the Ministry of the Interior and Kingdom Relations and is based in The Hague, the Netherlands. One of NOID's core tasks is to manage the travel document system and the responsibility over the production of passports and identity cards. She has set up and/or managed multiple (international) IT projects in the secure ID documents industry mainly focused

on the implementation of software upgrades on the application and production systems of travel and identity documents, implementation of new generation chips and introduction of a new document type. Dinusha coordinates the State Of The Art of Morphing Detection (SOTAMD) research project, which was awarded a Direct Grant by the European Union's Internal Security Fund — Borders and Visa in 2018.

## Jakob Dam Glynstrup



Jakob Dam Glynstrup is head of the Danish National ID Centre, which is an independent expert centre whose objective is to strengthen the security and control efforts within the immigration field. The Centre, which was established 1 January 2018, has a primary focus on advising and assisting Danish authorities regarding questions of identity determination and ID control of foreign nationals. One of the means of solving this task is performed by the center's biometric unit, whose task it is to assist and advise the Danish immigration authorities with complex identity resolution cases by

conducting fingerprint identification and facial image comparison at a forensic level.

Jakob has a background from the immigration field and served prior to his present position as head of division at the Danish Immigration Service for 9 years, where he mainly was responsible for Country of Origin Information issues and asylum case processing. Jakob has a master in Political Science and a bachelor in philosophy and has studied at the University of Roskilde (Denmark) and at McGill University (Canada).

## Lena Klasén



Lena Klasén has a PhD in Image Coding at Linköping University, Sweden and has led industrial- and research organizations such as Swedish Police Authority, Saab AB, Swedish Defence research Agency, Swedish Defence Material Administration, Swedish National Laboratory of Forensic Science and the Implementing Committee of the New Swedish Police organization at the Swedish Ministry of Justice. Dr. Klasén is since 2018 Research Director at the Swedish Police Authority, with the task to build up, establish and coordinate applied research to provide

new tools and methods for the Swedish Police force. January 2015 to November 2018 she was appointed Director of the Swedish National Forensic Center (formerly Swedish National Laboratory of Forensic Science). Lena has held several commissions of trust, e.g. as board member and expert, including being appointed as forensic expert by the US Department of Justice. Her industrial experience includes product portfolio management at Saab and being involved in starting up innovative companies.

## Frøy Løvåsdal



Frøy Løvåsdal is a Senior Adviser in the ID Section in the National Police Directorate in Norway, where she is responsible for Biometrics and Forensics. She has previously worked at the Directorate of Immigration, the Ministry of Foreign Affairs and the Norwegian ID Centre. She has 20 years experience working with Immigration, Passports, Identity, Anti-Fraud, Anti-Human Trafficking, Schengen Co-operation, Management and various System

Development Projects. She started working with Biometrics in 2008 when she was part of the Norwegian VIS Project. In 2013-2015 she was the Project Manager for a Pilot Project on Automated Facial Recognition, which was the first of its kind in the Norwegian Public Sector. She later brought "Morphological Analysis" (a type of Forensic Facial Comparison) to Norway, and implemented the method in the Norwegian Police.

# Research Projects 2019

## Research projects 2019

- 1. RHUMBO (ITN)**
  - Mariano Alcañiz
- 2. PRIMA (ITN)**
  - Raymond Veldhuis
- 3. TReSPAsS (ITN)**
  - Massimiliano Todisco
- 4. H-Unique (ITN)**
  - Sue Black
- 5. PROTECT**
  - James Ferryman
  - Dr. Susanne Kränkl
  - Simon Kirchgasser
- 6. BODEGA**
  - Sirra Toivonen
- 7. LIGHTest**
  - Heiko Roßnagel
- 8. SpeechXrays**
  - Dijana Petrovska,
  - Claude Bauzou
- 9. Smile**
  - Georgios Stavropoulos
- 10. FOLDOUT**
  - Maj Grzegorz Kostecki
- 11. TRESSPASS**
  - Dimitris K. Kyriazanos
- 12. SWAN**
  - Raghavendra Ramachandra
- 13. PYCSEL**
  - Jean-François Mainguet,
  - Marina Pouet
- 14. Stellar i-ris (SME)**
  - Johannes Junggeburth
  - Paula Bigalke
  - Matthias Heinrichs
- 15. QuardCard (SME)**
  - Frank Sandelov
- 16. SOTAMD**
  - Dinusha Frings
  - Luuk Spreeuwiers
  - Kiran Raja
  - Annalisa Franco
- 17. AMBER**
  - Richard Guest
  - Ellakiya Ellavarason
  - Salatiel Ezennaya
  - Anas Husseis
- 18. PERSONA**
  - Dariusz Kloza,
  - Simone Casiraghi
- 19. D4FLY**
  - Dimitrios Kyriazanos,
  - Armin Reuterz
- 20. RESPECT**
  - Marta Gomez-Barrero,
  - Antitza Dantcheva

## 1. RHUMBO (ITN)

Recent breakthroughs in neuroeconomics are helping to understand how the human decision-making process takes place. Although latest advances have revealed that most of the brain processes that regulate our emotions, attitudes and decisions are beyond our consciousness (implicit processes), many companies are still making strategic decisions relying upon explicit measures such as questionnaires and focus groups. However, the consumer neuroscience market is rapidly growing and demands new knowledge, new skills and new

approaches to adapt to the technological evolution of the sector but also for comprehending and communicating with consumers. These requests only find a partial match in existing doctoral programmes.

RHUMBO addresses this challenge by delivering an innovative multinational, multi-sectorial, and multidisciplinary research and training programme in cognitive neuroscience, transparently immersive experiences and artificial intelligence with a focus on neuro-business.

## 2. PRIMA (ITN)

The rapid digitalisation of society, characterised by a ubiquity of sensors (in mobile devices, CCTV cameras, IoT devices), a high degree of interconnectivity, cloud storage of all sorts of data, and extensive processing power, comes with increasing technology for personal information capture. Consequently, there is growing challenge to establish and maintain individual privacy. One factor contributing to the erosion of privacy is the growth in recognition technologies that not only facilitate the recognition of

individuals but also the inference from biometric data of emotional state, gender, health, age, and even profession. Another factor is fast advancement of artificial intelligence, allowing for extensive data mining, and aggregation, linkage and inference of personal information. Hence, there is a real possibility that acceptable privacy may become unattainable, unless technological and societal steps are taken to allow citizens to regain control of their personal information.

### Mariano Alcañiz



Dr. Mariano Alcañiz is Full Professor at the Polytechnic University of Valencia (Spain) and Director of the Laboratory of Immersive Neurotechnologies (LabLENI). He is a professor of Biomedical Engineering and has courtesy appointments in Virtual Reality. His research interest is to understand and classify the relevant significance of each aspect of the human activity and how to use this information in computer mediated technologies for enhancing human abilities and quality of life. From a technological point of view, his objectives are to improve interactive technology in virtual environments used at different formats and the development of algorithms, methods and techniques for ubiquitous and non-obtrusive measurement of human

activity. His research is being applying in different fields like health, psychology, marketing, human resources, education and training. Dr. Alcañiz has published more than 300 articles in books, journals and conferences. He has been coordinator of various European projects and national research projects related to the area. He is also coordinator of several national R&D programs of excellence. He is the National Program Coordinator of the Information Society Technology (IST) of the Ministry of Science and Innovation of Spain and he is the Spanish representative for ICT area at the Horizon 2020 European Research Program Committee. He is also member of the executive committee of EURO-VR association.

### Raymond Veldhuis



Prof. Dr. Raymond Veldhuis is a full professor in Biometric Pattern recognition at UTW, where he is leading a research lab in this field. His main research topics are face recognition, fingerprint recognition, vascular pattern recognition, multibiometric fusion, and biometric template protection. The research is both applied and fundamental. Raymond Veldhuis is Editor of IET-Biometrics and IEEE TIFS and chairman of the EAB Special Interest Group Academia. He teaches analogue and digital signal processing as well as biometrics and pattern recognition.

### 3. PROJECT TreSPAsS (ITN)

Biometrics recognition technology has revolutionised traditional person recognition technologies which rely on tokens or passwords. A soaring proliferation of cloud applications calls for enhanced security protection for distributed person authentication using biometrics, whereas the European general data protection regulation (GDPR) demands stringent provisions for privacy preservation. Unfortunately, concerns regarding security and privacy vulnerabilities, coupled with a lack of sufficient expertise to tackle them, present barriers to European competitiveness. Europe needs a new community of biometrics researchers capable of innovating the next

generation of biometrics technology designed both to protect security and preserve privacy.

The TReSPAsS-ETN project will deliver security protection through generalised presentation attack detection (PAD) capabilities, deliver privacy preservation through computationally feasible encryption solutions and deploy these new technologies to commercial-grade systems in full compliance with the GDPR. The project will enhance European research leadership and competitiveness and will help to sustain the flourishing biometrics market.

### 4. PROJECT H-Unique (ITN)

The H-Unique project continues research undertaken by the team since 2006. The research is driven by forensic casework and the need to identify the perpetrators of crime (predominantly child sexual abuse) from images. This process has been manual and is therefore time consuming. The H-Unique project seeks to automate the process through machine learning to be able to extract the anatomical features evident from the images and compare them across police databases with the aim to link previously unattributed crimes.

#### Massimiliano Todisco



Massimiliano Todisco is with EURECOM's Audio Security and Privacy Research Group and has interests in speaker recognition, anti-spoofing and privacy preservation. He is the inventor of constant Q cepstral coefficients for speaker verification anti-spoofing and is a co-organiser of the bi-annual ASVspoo challenge series. His work in anti-spoofing and privacy-preservation is supported through two funded projects: RESPECT (joint-national ANR-DFG) and TReSPAsS-ETN (EU H2020-MSCA-ITN).

#### Sue Black



Prof Dame Sue Black is Pro Vice Chancellor of Lancaster University, UK. She is a forensic anthropologist and a human anatomist. She is the President of the Royal Anthropological Institute (the professional body for forensic anthropology in the UK) and a fellow of the Royal Society of Edinburgh, The Royal Society of Biology and the Royal Anthropological Institute. She was awarded an OBE in 2001 and a DBE in 2016 by Her Majesty the Queen. She is author of 15 text books and over 150 peer reviewed publications. She has secured research funding in excess of £20M.

## 5. PROJECT PROTECT



PROTECT (2016-2019) is a 3-year EC H2020 project funded under the Secure Societies workprogramme (border security and external security) coordinated by the University of Reading, and which commenced in September 2016. The main aim of PROTECT is to build an advanced biometric-based person identification system that works robustly across a range of border crossing types and that has strong user-centric features. The main concept studied is a Biometric Capture Area (BCA), a sensor network configuration that spans a corridor performing reliable person

identification while travellers are 'on the move'. This scenario is supported through enhanced utilisation of traveller's mobile devices to perform biometric template storage and transmission to enable fluent identification, and greater exploitation of data held within future travel documents, to enable storage and access of other/enhanced biometrics. The project held two demonstrations in 2019 in Poland and the UK covering the use cases of travellers on foot and in vehicles. See <http://projectprotect.eu> for more information.

### James Ferryman



Prof. James Ferryman is a Professor Computational Vision at the University of Reading, UK. Prof. Ferryman leads the Computational Vision Group within the Department of Computer Science, School of Mathematical, Physical and Computational Sciences (SMPCS). His research interests include multimodal biometrics, automated surveillance, autonomous systems and performance evaluation. He is the author of more than 100 scientific publications. He has participated in a wide range of UK and EU funded research programmes including the EU EFFISEC project (FP7-217991) on efficient integrated security checkpoints and the EU FastPass project

(FP7-312583) on development of a harmonised modular reference system for all European automated crossing points. Prof. Ferryman coordinates the 10 partner EU PROTECT project (H2020-700259, 2016-2019) on exploration of current and future use of biometrics in border control. Prof. Ferryman is a member of the British Computer Society and has acted as the Director of both the British Machine Vision Association and the Security Information Technology Consortium. Since 2000, he has been a Co-Chair of the IEEE International Workshop on Performance Evaluation of Tracking and Surveillance.

### Dr. Susanne Kränkl



Dr. Susanne Kränkl (female) is Innovation Manager, Product Owner and Biometrics Expert at the Innovations Department of Veridos. In this function she is responsible for driving new innovative product ideas up to product level and biometric related standardization activities. Last year she joined the ISO/IEC JTC 1 / SC 37 / WG 5

„Biometric testing and reporting“ and focuses on presentation attack detection. Susanne is a main author of the G+D Whitepaper Digital Money (July 2017). She is based in Munich and holds a PhD in Physics from Siegen University, Germany.

### Simon Kirchgasser



Simon Kirchgasser is a Phd student at the University of Salzburg. He is member of the WaveLab research group within the Department of Computer Science. His research interests include biometrics (main focus on fingerprint and vascular biometrics), multimodal biometric template protection and corresponding performance evaluation as well as visual

security metrics. He is the author of several publications focusing on fingerprint ageing effects and fingervein template protection aspects. Within the EU PROTECT project he contributed in the field of multimodal template protection and vascular biometrics performance evaluation.

## 6. PROJECT BODEGA



BODEGA's aim was to develop future border checks with human factors expertise in order to enhance efficiency, border security and traveller satisfaction. The project focused on the changes to traveller processes and border controller work due to the introduction of smarter border control systems like automated gates and self-service systems based on biometrics. Bodega followed a user-centric approach throughout the course of the project to deliver informed recommendations regarding the consideration of the Human Factors for the implementation of the smart borders. These recommendations are grounded in a thorough knowledge of the field. The BODEGA project analysed

automated border check systems and the implications to human factors. The traveller is one important actor in the entire process and thus also the traveller's role needs to be carefully considered in the development and implementation of future technologies.

Timeline: 1.6.2015 – 31.10.2018

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No653676

<https://bodega-project.eu/>  
<http://happywise.eu/tmp/propertoolboxtest/#/main>

## 7. LIGHTest



Lightweight Infrastructure for Global Heterogeneous Trust management in support of an open Ecosystem of Stakeholders and Trust schemes. The objective of LIGHTest is to create a global cross-domain trust infrastructure that renders it transparent and easy for verifiers to evaluate electronic transactions. By querying different trust authorities world-wide and combining trust aspects related to identity, business, reputation etc. it will become possible to conduct domain-specific trust decisions. This is achieved by

reusing existing governance, organization, infrastructure, standards, software, community, and know-how of the existing Domain Name System, combined with new innovative building blocks. This approach allows an efficient global rollout of a solution that assists decision makers in their trust decisions. By integrating mobile identities into the scheme, LIGHTest also enables domain-specific assessments on Levels of Assurance for these identities.

### Sirra Toivonen



Sirra Toivonen is a Senior research scientist at VTT. She has worked at the Risk Management knowledge centre since 1995. She is graduated from the Technical University of Tampere with measurement and sensor technologies as the main subjects. The research areas have included security and safety management and development in various areas including border control and global supply chains, product and system usability design and value creation in security area product

innovations. Through EU funded projects (FastPass, Bodega, Aresibo, Foldout, Effisec) and various national security management projects she has a profound knowledge on border management system development, sensor technologies and the assessment of these systems. In 2013, she earned her certification as a Project Management Professional (PMP) issued by the Project Management Institute.

### Heiko Roßnagel



Dr. Heiko Roßnagel is head of the Competence Team Identity Management at the Fraunhofer Institute for Industrial Engineering IAO. He studied computer science at the Technical University of Darmstadt. He received a PhD in business administration and economics at the Goethe-University Frankfurt. He is currently coordinating the EC-funded H2020 project LIGHTest and has coordinated the FP7 project FutureID. He has been participating in several European and national cooperative

research projects such as the EC-funded projects Wireless Trust for mobile business (WiTness), Future of Identity in the Information Society (FIDIS), Scoping the Single European Digital Identity Community (SSEDIC), SECUR-ED and national projects such as VerSiert, VERTRAG, SkiIdentity, SANDRA, CUES, Industrial Data Space and ENTOURAGE. His research interests are in the areas of security, privacy and identity management with a focus on human factors and technology development and adoption.

## 8. SpeechXRays

### SPEECHXRays

The SpeechXRays project will develop and test a user recognition platform based on voice acoustics analysis and audio-visual identity verification, in real-life environments. Our goal is to develop and test a cost effective, convenient, privacy-preserving multimodal biometric solution based on acoustic and machine vision analysis of audio-visual biometric data. The novel biometric solution is implemented for a broadband network, giving access to smart services running over networks with state-of-the-art security, avoiding single points of failure. The platform will guarantee interoperability and portability between systems and services.

The technology developed in the project is versatile and can be used to provide secure access to networks as well as physical locations (the workforce use case will include a physical access control demonstration). The technology is designed to be portable across different operating systems.

The solution will be validated by industrial partners in large-scale real-life use cases. The project will test the solution in three real-life use cases requiring various degrees of security:

- workforce use case
- eHealth use case
- consumer use case.

### Claude Bauzou



Claude Bauzou graduated from Ecole Normale Supérieure de Paris and Ecole des Mines de Paris, and has a PhD from Orsay University (1983). She joined Morpho Systèmes in 1986 as a research engineer, and has been in charge of improving the fingerprint comparison system for some years. She started working in business

development group in 1990, and has been involved in Morpho major projects, like the US AFIS for the FBI. Until 2018, Claude has been focusing on face recognition as a product manager.

### Dijana Petrovska-Delacrétaz



Dijana Petrovska-Delacrétaz obtained her degree in Physics and her PhD from the Swiss Federal Institute of Technology (EPFL) in Lausanne (1990). She was working as a consultant at AT&T, as a post-Doc at Télécom ParisTech, and as a Senior Scientist in the Informatics Department of Fribourg University, Switzerland. Since 2004, she joined Télécom SudParis as associate professor, and is part of the CNRS Lab.

SAMOVAR. Her research activities are oriented towards pattern recognition, signal processing, and data-driven machine learning methods, that are exploited for different applications such as speech, speaker and language recognition, very low-bit speech coding, biometrics (2D and 3D face, and voice), and crypto-biometrics (including privacy preserving biometrics).

## 9. SMILE



SMILE proposes a novel mobility concept that addresses the aforementioned challenges by designing, implementing and evaluating a prototype management architecture, for the accurate verification, automated control, monitoring and optimization of people's flows at Land Border Infrastructures. It leverages the capabilities of the smart mobile devices in biometric control for secure and trusted authentication and elaborates on their exploitation as part of a multimodal biometric verification process that supplements/complements existing approaches. Furthermore, SMILE's mobility concept builds upon Private Cloud Infrastructure technologies which

communicate with remote SMILE handhelds through a secure gateway. SMILE ecosystem will target EU land borders which will be the beneficiaries of the proposed solutions. SMILE aims to (1) minimise the exposure of BCPs to security risks and threats, and (2) help them successfully respond to security incidents, while relieving them from all unnecessary and costly efforts of identifying, acquiring and using the appropriate technology. To this CNBP, HBP & RBP BCP partners will deploy and validate the proposed secure & reliable ecosystem in two use cases (Romania Bulgaria), in which the adaptation of SMILE framework to focused applications will be performed.

## 10. Project Foldout



The FOLDOUT platform will assist border guards by providing prompt detection of illegal activity at borders and trace the movement and routes prior to arrival in border areas. FOLDOUT will build a system that combines various sensors and technologies and intelligently fuses these into an effective and robust intelligent detection platform. FOLDOUT will make the tasks of Border Guards simpler and faster by combining events from various sensors to give a complete situation threat assessment combined with suggested reaction scenarios. With a two year pilot in Bulgaria and demonstrators in Greece, Finland and French Guiana,

FOLDOUT will provide fundamental enhancements in the domain of border surveillance and improved search & rescue scenarios. The technical concept of FOLDOUT is based on the combination of several sensor technologies on the ground and on special, high rising platforms with data fusion algorithms into a single, seamlessly integrated system. This concept allows for the real-time detection of critical events (e.g. illegal cross border activities, lost persons) even under dense foliage. The alarms are presented to border guard operators in a common operational picture in a unified data presentation for all sensors.

### Georgios Stavropoulos



Georgios Stavropoulos received the Diploma degree in Electrical and Computer Engineering from the Aristotle University of Thessaloniki, Thessaloniki, Greece, in 2006. He is currently a research associate in the Information Technologies Institute Center for Research and Technology Hellas in Thessaloniki, since 10/2006 and a PhD Candidate with the Department of Electrical and Computer Engineering of the University of Patras, since 02/2014. His main research interests include signal processing, computer vision, machine learning, visual analytics, text mining and more. He is an expert developer, with a lot of experience in C++,

C# and Python programming languages, a number of libraries, SDKs and API's, and has developed numerous applications and algorithms for information collection and visualization, text mining, text sentiment estimation and more. He is a member of the Technical Chamber of Greece. His involvement with these research areas has led to the authoring and co-authoring of articles in refereed journals and international conferences. Since 2006, Mr. Stavropoulos has been involved in a number of FP7 & H2020 European projects, as well as a number of national projects, in both technical and managerial roles.

### Grzegorz Kostecki



BG Maj Grzegorz Kostecki, Expert - Coordinator in the Border Infrastructure and Information Unit Border Management Department of the Polish Border Guard HQ  
  
Age: 42 years. In service at the Border Guard 21 years.

## 11. Project TRESSPASS



TRESSPASS is a H2020 42-month Innovation action project that covers air, maritime and land (including car and train) border crossing points, and specifically travel routes that combine different modalities. With regards to threats, this includes smuggling, irregular immigration, cross border crime, and terrorism, including threats to the transport itself.

The project covers all tiers of the four-tier access model:

- (1) measures undertaken in, or jointly with third countries or service providers;
- (2) cooperation with neighbouring countries;
- (3) border control and counter-smuggling measures, and
- (4) control measures within the area of free movement.

TRESSPASS

(a) develops a single cohesive risk-based border

management concept

- (b) develops three pivoting pilot demonstrators: Schiphol Airport, Polish Land Border at External EU crossing control point and Port of Piraeus
- (c) demonstrates the validity of the single cohesive risk-based border management concept by using red teaming and simulations
- (d) prepares for the further development of this concept beyond this project by linking to other known risk-based border management frameworks and on national levels), and describe how their results contribute to a single cohesive risk-based border management concept.

TRESSPASS is a strong European Consortium of 22 partners. TRESSPASS project is funded by the European Union and the Horizon 2020 programme, under GA no 787120.

## 12. PROJECT SWAN



The SWAN (Secure Access Control Over Wide Area Network) project's goal is to research and develop countermeasures and innovative technologies that lead to a usable, economic, and privacy-preserving access control platform based on biometrics. The research will allow the authentication of banking transactions and secure access to services over broadband and mobile networks, using biometric identifiers. This can be extended to other eServices (E.g., eHealth). Biometric references will be stored, controlled and verified locally

based on preshared secret, which can be used to seal and authenticate transaction data. This overcomes the need for centralized storage of biometric data. Furthermore, smart-phones will act as hardware tokens to which the additional functionalities will be integrated to capture the biometric modalities like (2D face, fingerprint, voice and eye). The biometric authentication will be optimized in the transaction protocol design with guaranteed privacy compliant.

### Dr. Dimitris M. Kyriazanos



Dr. Dimitris M. Kyriazanos received his Diploma in 2005 and his Ph.D. degree in 2009 both in Electrical and Computer Engineering (ECE) from the National Technical University of Athens (NTUA), Greece. He is a Research Assistant Professor and the Head of Secure and Resilient Societies Unit in ISL group of the Institute of Informatics and Telecommunications of the National Centre for Scientific Research "Demokritos" (NCSR-D). He has coordinated and obtained significant European Commission (EC) research grants in the challenging areas of airport security -DRS-16-2014- and risk based screening at border crossing -SEC-15-BES-2017. He has extensive research work in the context of EC Security Research projects, having participated in more than 14 successfully completed

projects since FP6, collaborating constantly with End Users from Civil Protection, Homeland Security and Defence, contributing to the development of a wide range of innovative prototype security management systems, applications and services, while publishing the results of his work in scientific journals, international conferences and book chapters. His research interests include integrated security management and command and control systems, risk based security, AI ethics, behaviour analytics and automated decision making, indoor location based services, data fusion, data protection and PETs, privacy and ethics by design and other topics.

### Raghavendra Ramachandra



Raghavendra Ramachandra R. Raghavendra received the bachelors degree from the University of Mysore (UOM), Mysore, India, the masters degree in electronics and communication from Visvesvaraya Technological University, Belgaum, India, and the Ph.D. degree in computer science and technology from UOM and Institute Telecom, and Telecom Sudparis, Evry, France (carried out as a collaborative work). He is currently appointed as a Professor with the Norwegian Biometric Laboratory,

Norwegian University of Science and Technology (NTNU), Gjøvik, Norway. He was a Researcher with the Istituto Italiano di Tecnologia, Genoa, Italy. His main research interests include statistical pattern recognition, data fusion schemes and random optimization, with applications to biometrics, multimodal biometric fusion, human behavior analysis, and crowd behavior analysis. He has authored several papers and is a reviewer for several international conferences and journals.

### 13. PROJECT PYCSEL



The PYCSEL project objective is to design an innovative very large active thermal fingerprint sensor (4 fingers, 1500x1600 pixels), using printed PVDF-based pyroelectric material, combined with an IGZO TFT matrix foil allowing

more complex design functionality to increase performance and reduce system cost, and capable of high resolution (500 dpi).  
<https://www.pycsel-project.eu/>

#### Marina Pouet



Marina Pouet is a project manager for research projects and European collaborative projects. She holds an Engineer degree in Electronics and Optics from the INPG (Grenoble, France) and joined the Research & Technology unit of IDEMIA (formerly Safran Identity & Security) in 2000. She has a large experience in biometric acquisition devices, working from the

hardware device's conception to the validation of high level quality of biometric data. She recently managed the European Project FP7 EFFISEC and participated to the European Project FP7 INGRESS.

#### Jean-François Mainguet



Jean-François Mainguet became an engineer for Télécommunications de Bretagne in 1984. Since joining Thomson-CSF Semiconducteurs Spécifiques, Grenoble in 1984, he has been engaged in the development of SOS and SOI rad-hard semiconductor devices, electrical simulation, layout & mask design tools, analog to digital converter design and invented the

sweeping technique for direct silicon fingerprint scanning. He was chief scientist of the FingerChip® project since Thomson became Atmel in 2000. In 2009, he joined the CEA-Leti, Grenoble.

### 14. PROJECT Stellar i-ris (SME)

Stellar is a provider of satellite and fibre-based communication. In the past 5 years, it has specialized itself additional in the field of image pupillometry and developed Stellar i-ris: a device to detect

human fatigue and the intake of alcohol, drugs or medication, e.g. to prevent accidents on roads and at safety-critical workplaces.

#### Johannes Junggeburch



Johannes Junggeburch has completed a training in communications engineering in Cologne. After that, he studied at the University of Applied Sciences and Technology (RWTH) in Aachen and was involved in scientific projects in electronic colour image processing. He worked as department leader at the Institute for Technical Electronics at the RWTH Aachen. At the University of Freiburg he was project manager in the field of light-colour measurement.

Since 2015 he is CEO research project i-ris at Stellar DBS GmbH. He has key competences and experience in the conception and development of measuring equipment, as well as experimental setups for the measurement of the pupil diameter in changing environments.

## Paula Bigalke



Paula Bigalke has studied physics at the University of Applied Sciences and Technology (RWTH) in Aachen and completed her M. Sc. in astro-particle physics in 2018. In the context of her thesis she developed data analyses for the Pierre Auger Collaboration. In 2015 - 2016 she did a voluntary social year and worked as an elementary school teacher in Pokhara, Nepal. Until February 2019 she was employed as a research assistant and software developer at the Fraunhofer Institute for Laser Technology ILT in Aachen.

Since April 2019 she is part of the Research and Development Team of Project i-ris at Stellar DBS GmbH.

## Matthias Heinrichs



Matthias Heinrichs is studying computer science at the University of Applied Sciences and Technology (RWTH) in Aachen since 2008. In the course of his studies he started working in several scientific projects.

Since February 2019 he is part of the Research and Development Team of Project i-ris at Stellar DBS GmbH.

## 15. Project QuardCard



The QuardCard project a disruptive, highly secure smart card (QuardCard), including a three-factor authentication system to improve the security of online and physical transactions including E-banking, E-commerce and E-government, Crypto Currency exchange platforms, blockchain and which is currently facing major increases in fraud levels and Cyber-attacks. QuardCard combines, for the first time a full and secure authentication solution with:

- Something you have: a smart card – all data is kept inside the card with only encrypted keys are released (privacy is protected)

- Something you are: a biometric fingerprint – highly accurate and impossible to copy (only correct biometric will give access)
- Something you know: the password, CVV (Card Verification Value), PIN (Personal Identification Number) or OTP (OneTime Passcode)

A distinctive advantage of the QuardCard is that this password, CVV, PIN or OTP is dynamic and is generated by the user's fingerprint, making it truly individual and secure.

## Frank Sandelov



Frank Sandelov has 9 years of operational experience with CardLab starting with 3 years as Chairman of the board and 6 years as managing director (CEO).

Frank has an Army Aviation Officer background and served 11 years as Platoon leader, flight instructor, maintenance & test pilot and electronic warfare officer. Additional 24 years of experience within the airline business, including 14 years' experience as a Captain at Scandinavian Airlines. During a period of 3 years Frank served as a SAS representative in the SESAR workgroup under the EU Commission

with main areas of work to be Concept of operation and passenger processing at airports.

Frank has also served as the CardLab representative supporting the IATA strategic partnership and supported the IATA One ID workgroup as a biometric industry representative. Frank has in addition held several board position in different companies and organizations over the last 35 years and have now dedicated this time to provide unique user identification and full privacy protection for virtual and physical interaction with the IT world.

## 16. Project SOTAMD

Biometric systems, in the application process of identity documents and in border control, are vulnerable to so-called morphed face image attacks. In such attacks, biometric samples of multiple subjects are merged, in order to allow an unlawful but successful verification of all contributing subjects against the created artificial identity.

SOTAMD is a 12-month ISF-project with the objective to identify the state-of-the-art of morphed face image detection mechanisms. The project will mimic the automated border control gate scenario, where the live face image of the gate is compared against the image in the chip of the passport. By collecting a dataset

of bona fide images and creating hundreds of morphed face images the SOTAMD project will evaluate, if current state-of-the-art is sufficiently mature to be deployed as immediate response to the threat.

An important result of this project is an open access evaluation platform (hosted by the University of Bologna) such that governmental agencies, research institutes and others can test and compare Morphing Attack Detection (MAD) mechanisms and determine whether and when a solution is mature for deployment at border control points.

### Dinusha Frings



Dinusha Frings manages national and international research projects for the National Office for Identity Data (NOID). NOID is part of the Ministry of the Interior and Kingdom Relations and is based in The Hague, the Netherlands. One of NOID's core tasks is to manage the travel document system and the responsibility over the production of passports and identity cards. She has set up and/or managed multiple (international) IT projects in the secure ID documents industry mainly focused

on the implementation of software upgrades on the application and production systems of travel and identity documents, implementation of new generation chips and introduction of a new document type. Dinusha coordinates the State Of The Art of Morphing Detection (SOTAMD) research project, which was awarded a Direct Grand by the European Union's Internal Security Fund — Borders and Visa in 2018.

### Annalisa Franco



Annalisa Franco is Assistant Professor at the Department of Computer Science and Engineering, University of Bologna, Italy. She received her Laurea degree cum laude in Computer Science in 2000 from the University of Bologna. In 2004 she received her Ph.D. in Electronics, Computer Science and Telecommunications Engineering at DEIS, University of Bologna for her work on Multidimensional Indexing Structures and their application is pattern recognition. She

is a member of the Biometric System Laboratory at Computer Science - Cesena. She authored several scientific papers and served as referee for a number of international journals and conferences. Her research interests include Pattern Recognition, Biometric Systems, Image Databases and Multidimensional Data Structures. Recent research activity is mainly focused on different applications of automatic face recognition

### Luuk Spreeuwers



Luuk Spreeuwers studied Electrical Engineering at the University of Twente, Netherlands from 1982-1988. In 1992 he obtained his PhD from the University of Twente. Subsequently Luuk Spreeuwers worked as a postdoc at the ITC and the University of Twente on 3-D image analysis of aerial image sequences and in Budapest at the Hungarian Academy of Sciences on a 3-D textures ERCIM project.

He is now Associate Professor at the chair for Data Management and Biometrics of the Faculty for Electrical Engineering, Mathematics and Informatics at the University of Twente leading research in Biometrics, in particular 2D and 3D face recognition.

### Kiran Raja



Kiran Raja received his Bachelor of Engineering degree in Electronics and Communication from Visvesvaraya Technological University, India, in 2007, and the M.S. degree from Erasmus Mundus Master CIMET, France, and Norway in 2013. He obtained his PhD in computer Science (Biometrics and Image processing) from Norwegian University of Science and Technology (NTNU), Norway in 2016. Kiran Raja is currently appointed as an Associate

Professor at the Faculty of Computer Science with Norwegian University of Science and Technology (NTNU), Norway. Between 2007 to 2011, he was with Tata Elxsi Ltd., Bangalore, India, Bally Technologies Ltd., Bangalore, India, and Technicolor Inc., CA, USA. His main research interests include statistical pattern recognition, image processing, and machine learning with applications to biometrics, security and privacy protection.

## 17. Project AMBER



AMBER (“enhAnced Mobile BiomEtRics”) is a EU Marie Skłodowska-Curie Innovative Training Network which addressing a range of current issues facing biometric solutions on mobile devices. AMBER comprises ten integrated Marie Skłodowska-Curie Early Stage Researcher (ESR) projects across five EU universities:

- University of Kent (UK)
- Università degli Studi Roma Tre (Italy)
- Universidad Carlos III de Madrid (Spain)
- Politechnika Warszawska (Poland)
- Otto-von-Guericke-Universität Magdeburg (Germany)

The Network has the direct support of seven Industrial Partners.

The aim of the Network is to collate Europe-wide complementary academic and industrial expertise, train and equip the next generation of researchers to define, investigate and implement solutions and theory to ensure secure, ubiquitous and efficient authentication whilst protecting privacy of citizens. The themes for investigation include: mobile platform usability and reliability, novel solutions for mobile biometric interaction, and privacy, security and confidence in mobile biometric interaction.

[www.amber-biometrics.eu](http://www.amber-biometrics.eu)

### Dr. Richard Guest



Dr. Richard Guest is Reader in Biometric Systems Engineering at the University of Kent. His research interests lie broadly within image processing and pattern recognition, specializing in biometric and forensic systems, particularly in the areas of image and behavioral information analysis, standardization and document processing. He has had significant involvement with biometric standards development as Panel Chair of the UK BSI IST/44 Working Group on

Biometric Technical Interfaces and as UK Principal Expert to ISO/IEC in this area representing the UK industrial, governmental and academic interests. He has over 100 peer-reviewed publications, acted as editor of 3 international standards and has obtained funding from UK EPSRC, ESRC, EU, charitable funds and industry. He is the Project Coordinator of the AMBER EU Marie Curie ITN on mobile biometrics systems.

### Elakkiya Ellavarson



Elakkiya Ellavarson obtained her MSc degree in Computer Science from Denmark Technical University in 2013. She is currently pursuing her PhD degree from University of Kent, Canterbury. She is a Marie Curie Early Stage Researcher, working under EU Horizon 2020 project titled AMBER (“enhAnced Mobile BiomEtRics”) which is a Marie Skłodowska-Curie Innovative Training Network. Her current research is focused

on mobile biometrics, specifically to conduct performance evaluations and usability assessments of touch-dynamics based behavioural biometrics. Additionally, she has also undertaken a research project focusing on effects of ageing in iris from CASED (Centre for Advanced security Research Darmstadt) in 2013. She holds a Bachelor of Engineering degree from Karunya University, India.

### Salatiel Ezennaya-Gomez



Salatiel Ezennaya-Gomez holds a Bachelor degree in Telecommunication Engineering from the Polytechnics University of Catalunya and Master’s degrees in Telecommunication Networks for developing countries and Bioengineering and Telemedicine from the University Rey Juan Carlos and Polytechnics University of Madrid in Spain, respectively. After working in industry in the fields of Logistics and Financial markets, she worked for research

centres in Spain (European Center for Softcomputing) and Italy (Research Centre E.Piaggio of University of Pisa). Her research studies and publications were related to Intelligent Data Analysis in the field of Neurobiology and Biomedical Signal Processing for Emotion Recognition. She received the best student paper award at the conference IFSA/EUSFLAT 2015 with the resulting paper “Mining Significant Frequent Patterns in Parallel Episodes with a Graded Notion of Synchrony”.

### Anas Husseis



Anas Husseis received his engineering degree in Communication Engineering from Yarmouk University, Irbid, Jordan, in January 2012, and obtained his master’s degree in Multimedia Networking with the thesis title: “Optimization Method for HDR Images Tone Mapping Operator” at Telecom-Paristech, Paris, France, in September 2017. Prior to his master’s studies he had gained over five years’ experience

working with telecom operators in the field of Digital Services. He is currently a researcher at Carlos III University of Madrid, where his research investigates presentation attack and presentation attack detection in Biometrics.

## 18. Project PERSONA



The increasing number of travelers crossing European borders is putting a mounting pressure on the everyday handling of border checks. On one side, border control authorities have to process a higher number of checks, while maintaining national security, in an increasingly reduced amount of time to avoid congestion or cope with limited resources. As a consequence, the experience of both European and third country travelers is deteriorating due to the extra time they have to spend at the border checkpoints. Such a continuous need calls for flexible, automated and scalable “no-gate” border security solutions. On the other side, the intensive use of technologies bears the risk to invading people’s privacy, and the societal and political acceptance of technologies for contactless border security solutions is required prior to their implementation.

The main research question of PERSONA project is: how is it possible to design and establish unified and tailored impact assessment method to appropriately assess the effects of new border-controlling technologies? How can we ensure that these solutions meet the requirements and expectations of both governments, law enforcement authorities (LEAs) and border crossing individuals? PERSONA will carry out comprehensive assessment of the acceptability of wide range of contactless crossing point technologies, taking into account human behavior, gender, legal frameworks, privacy concerns, societal issues and potential risk of discrimination. The established method for assessment will provide important information for decision makers in form of potential risks, mitigation measures and guidelines, in order to drive the innovation and deployment of future solutions by industry and border authorities.

## Simone Casiraghi



Simone is a doctoral researcher at the Vrije Universiteit Brussel (VUB), with Prof. Paul De Hert as a promoter. At the research group on Law, Science, Technology and Society (LSTS), he is involved in the EU H2020 project PERSONA, whose aim is to design a tailor made impact assessment method for so-called ‘no-gate’ crossing technologies. He is also a member of the Brussels Laboratory for Data Protection & Privacy Impact Assessments (d.pia.lab). His research interests are in philosophy of technology, the intersection between law and Science and Technology Studies (STS), enhancement technologies and ethical and legal aspects of biometrics.

His background is in philosophy of technology and STS. In 2016 he obtained a Bachelor’s degree in philosophy at the University “Vita-Salute San Raffaele” in Milan (cum laude), where he combined his interests in bioethics with neuroscience and psychology. In 2018 he got his Masters of Science in Philosophy of Science, Technology and Society at the University of Twente, the Netherlands (cum laude). In particular, he specialized in surveillance technologies and privacy with a thesis on biometrics, identity management and the philosophy of personal identity.

## Dariusz Kloza



Dariusz (Darek) Kloza is a researcher at the Research Group on Law, Science, Technology and Society (LSTS) at the Vrije Universiteit Brussel (VUB), where he is a founding member of the Brussels Laboratory for Data Protection & Privacy Impact Assessments (d.pia.lab). He also freelances at the Centre for Direct Democracy Studies (CDDS) at the University of Białystok (Poland). His expertise concentrates on the governance of privacy and personal data protection, in particular on the notion of impact assessments for

emerging technologies. He holds both an LL.M. in Law and Technology (2010) from Tilburg Institute for Law, Technology, and Society (TILT) at Tilburg University (with distinction) and a master degree in law from the University of Białystok (2008), including a student exchange at the University of Copenhagen (2007-08). Previously, he held in parallel a part-time research position at Peace Research Institute Oslo (PRIO; 2015-17) and visiting fellowships, among others, at Bond University (Queensland, Australia; 2016).

## 19. Project D4FLY

The D4FLY project will augment the current capabilities and capacities of border authorities in countering emerging threats in document and identity verification (e.g., forged documents, impostor fraud, morphed faces) at manual and highly automated border control points and in the issuance process of genuine documents. The confluence of D4FLY set of tools and systems will improve the quality of verification and reduce major time sinks in the processes thus enabling real on-the-move border crossing experience for travelers. Novel sensor hardware based on advanced lightfield cameras and novel algorithms developed in the project will enhance verification accuracy and robustness via the combined usage of 2D+thermal face, 3D face, iris and somatotype biometrics. Analytical means to identify known criminals based on somatotype and 3D face data generated from mugshots and observation data will be developed. Various operational needs of

end-users with different threat landscapes constitute the backbone of D4FLY development efforts. D4FLY will create a resilient document verification system that can verify a multitude of physical and electronic security features (e.g. Kinegrams®, MLIs, CLIs), detect complex forms of electronic fraud and advanced morphing, and identify fraud in breeder documents. The potential benefit of blockchain technology in identity verification will also be investigated. The D4FLY solution will consist of a border control kiosk geared with enhanced enrolment, verification and detection capabilities; smartphones applications for improved performance and verification capabilities; and a non-stop on-the-move system for biometric verification. The innovation will be validated against European societal values, fundamental rights, privacy, data protection and applicable legislation. Four different border control points and one document fraud expertise center will form the project's testing and demonstration ground.



### Dr. Dimitris Kyriazanos

Dr. Dimitris M. Kyriazanos received his Diploma in 2005 and his Ph.D. degree in 2009 both in Electrical and Computer Engineering (ECE) from the National Technical University of Athens (NTUA), Greece. In 2006 he joined and remains since with the Integrated Systems Laboratory (ISL) of the Institute of Informatics and Telecommunications (IIT). He is currently a Research Assistant Professor and Head of ISL Security Unit. He has obtained significant European Commission (EC) research grants in the challenging areas of preparedness for and management of large scale forest fires (FP7 Integration Project AF3), airport security (FLYSEC DRS-16-2014) and risk based screening at border crossing (TRESSPASS SEC-15-BES-2017) -having acted as Coordinator in the latter

two. applications and services, while publishing the results of his work in scientific journals, international conferences and book chapters. His research interests include integrated security management and command and control systems, risk based security, automated decision making, indoor location based services, data fusion, data protection and PETs, privacy and ethics by design and other topics. He is an active member of the European and international community of researchers, professionals and end users working jointly in the area of secure and resilient societies, participating in multiple bodies and advisory boards as a known expert in the area.



### Armin Reuter

Armin Reuter is a project manager for innovation projects at Veridos. Veridos GmbH is a joint venture between the Giesecke + Devrient Group (G&D) and the German state printer Bundesdruckerei. Armin works in the G&D Group since 2010, leading various projects in the government solution business for the German Public Sector like the eID and health segments, as well as projects related to development and implementation of secure documents, card operating systems and applications.

Prior to Giesecke&Devrient he held various positions in project and program management as well as technical marketing in the Semiconductor and EDA industry at Synopsys, Siemens, Infineon Technologies and Qimonda. He is a certified Project Management Professional (PMI) and holds a masters degree in electronic engineering from the Friedrich-Alexander University in Erlangen.

## 20. Project RESPECT

RESPECT, a Franco-German collaborative project, will explore the potential of using multi-biometrics as a means to defend against diverse PAs and improve generalisation while still preserving privacy. Central to this idea is the use of (i) biometric characteristics that can be captured easily and reliably using ubiquitous smart devices and, (ii) biometric characteristics which facilitate computationally manageable

privacy preserving, homomorphic encryption. The research will focus on characteristics readily captured with consumer-grade microphones and video cameras, specifically face, iris and voice. Further advances beyond the current state of the art involve the consideration of dynamic characteristics, namely utterance verification and lip dynamics.

### Marta Gomez-Barrero



Marta Gomez-Barrero received her MSc degrees in Computer Science and Mathematics, and her PhD degree in Electrical Engineering from Universidad Autonoma de Madrid, in 2011 and 2016, respectively. Since 2016 she is a postdoctoral researcher at the National Research Center for Applied Cybersecurity (CRISP), Germany. Her current research focuses on security and privacy evaluations of biometric systems,

Presentation Attack Detection (PAD) methodologies and biometric template protection schemes. She is the recipient of a number of distinctions, including: EAB European Biometric Industry Award 2015, Best Ph.D. Thesis Award by Universidad Autonoma de Madrid 2015/16, Siew-Sngiem Best Paper Award at ICB 2015, Archimedes Award for young researches from Spanish MECD and Best Poster Award at ICB 2013.

### Antitza Dantcheva



Antitza Dantcheva is an expert in computer vision and machine learning. Her research is focused on interpreting different information extracted from the human face and body. Her latest results deal with automated healthcare, and specifically with expression recognition for Alzheimer's disease patients. Other of her recent results deal with the impact of facial cosmetics on automated gender- and age

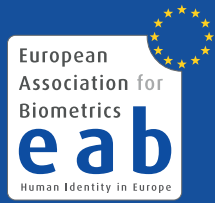
estimation, as well as face recognition – with focus on impact analysis and on algorithm design, which reduces such impact. She has numerous highly cited journal and conference publications in top journals (IEEE Trans. On Information Forensics and Security (TIFS), Multimedia Tools and Applications (MTAP)) and conferences, as well as

## Demonstrations 2019

# Demonstrations

1. **Stellar i-ris (SME)**
2. **QuardCard (SME)**
3. **SMART-TRUST**
4. **SOTAMD**
5. **PYCSEL**
6. **SWAN**
7. **LIGHTest**





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