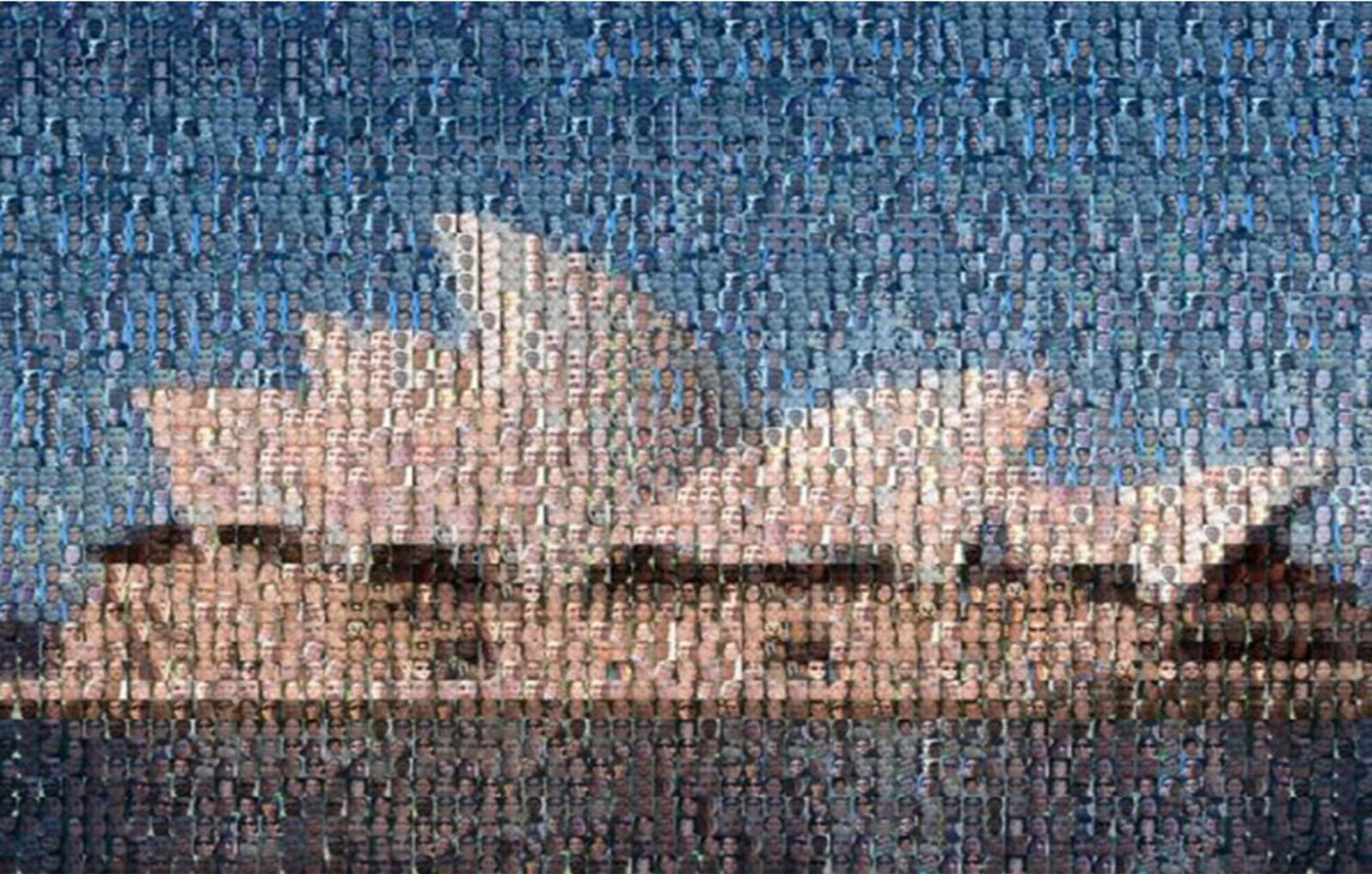




# UNFAMILIAR FACE IDENTIFICATION GROUP



# CONFERENCE PROGRAM 2018

Monday - Tuesday  
12-13 February



**UNSW**  
SYDNEY



# Introduction

Welcome to the Unfamiliar Face Identification Group Meeting 2018.

The first UFIG meeting was held at UNSW in February 2013. The idea was to bring together delegates from government, police, industry and universities to discuss key issues in unfamiliar face identification, in an informal setting. UFIG is now a diverse group that includes users and developers of face identification systems, academic researchers that study human and computer components of these systems and scholars interested in their legal implications. This work is of both academic interest to researchers in the field of face recognition and of practical significance to those who use these systems to identify customers, passengers, citizens or offenders.

The first meeting in 2013 was a great success, and has been repeated annually since then. This will be our 6th meeting, and we are equally delighted to welcome first-time attendees as we are to greet some familiar faces. It is great to see that word about UFIG is spreading, and that several new groups are represented for the first time this year. A particular strength of our meetings is the relaxed, collaborative approach we all adopt, so we hope that you will see the opportunities afforded by the breaks and the networking breakfast to introduce yourselves to your fellow delegates and meet as many unfamiliar faces as possible!

This year we are particularly pleased to be able to welcome our keynote speaker, Reuben Moreton, Forensic Imagery Development Manager of the Metropolitan Police, UK, to open our conference. We thank *The Westbourne Group* for their financial support, which made Reuben's visit possible.

Over the next two days, we will hear a variety of presentations from system managers, users, developers, lawyers, researchers and others. You will see that we have allocated 20 minutes to each presentation. We want this time to be divided equally between the paper and the discussion that follows because in our experience, these two components of the presentation are of equal value. We hope that you will feel able to contribute your perspective to these discussions.

Australia has emerged as a world leader in applied face processing research and policy. This is in no small part due to the remarkably close relationships that have developed between the various stakeholders in this field. We think that the UFIG meeting has played a role in developing and maintaining these relationships, and are very grateful for your contribution to this important endeavour.

Richard Kemp & David White

UNSW Sydney, February 2018

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# Schedule

Time	Topic	Presenter
<b>Monday 12th February</b>		
Tyree Energy Technologies Building, Lower Ground Floor, LG05		
9.00 - 10.15 am	Networking breakfast	
10.15 - 10.30am	Introduction	Richard Kemp (UNSW)
<b>Keynote Presentation 1</b>		
10.30 - 11.30am	Good practice in facial identification: Bridging the gap between academic research and practitioner working groups	Reuben Moreton (MPS)
<b>Session 1</b>		
11.30 - 11.50	An update on photo morphing in a real-world environment	David Chadwick (DFAT)
11.50 - 12.10	Passport facial image morphing detection using deep learning and artefact analysis	Joshua Abraham (DIBP)
12.10 - 1.30 Lunch		
<b>Session 2</b>		
1.30 - 1.50pm	Making faces familiar: Can within-face variability created using a principal component analysis improve unfamiliar face identification?	Tamara Gradden (UNSW)
1.50 - 2.10pm	Does image quality affect response bias?	Harold Hill (UOW)
2.10 - 2.30pm	Quantifying image quality	Glenn Porter (UNE)
2.30 - 3.00pm Afternoon break		
<b>Session 3</b>		
3.00 - 3.20pm	Visual behaviour and decision-making in lineup identification tasks	Celine van Golde (USYD)
3.20 - 3.40pm	Police body worn cameras: Policy and research	Richard Kemp (UNSW)
3.40 - 4.00pm	Dual-target cost when searching for faces in a crowd	James Dunn (UNSW)
4.00 - 4.20pm	As unique as a snowflake: Examining the importance of rare features in match-making decisions.	Bethany Grownns (UNSW)
<b>4.20 - 5.00pm General Discussion</b>		
6.00pm Dinner at Whitehouse, UNSW (must RSVP beforehand to attend)		

<b>Time</b>	<b>Topic</b>	<b>Presenter</b>
<b>Tuesday 13th February</b>		
Tyree Energy Technologies Building, Lower Ground Floor, LG05		
<b>Keynote Presentation 2</b>		
9.30 - 10.30am	Identification and expertise: Legal update	Mehera San Roque and Prof. Gary Edmond
10.30 - 11.00am Morning break		
<b>Session 1</b>		
11.00 - 11.20am	Face research at the Defence Science and Technology Group: 2018 Update	Rebecca Heyer (DST Group)
11.20 - 11.40am	Findings from an examination of practitioner and algorithm performance when comparing facial images of children	Dana Michalski (DST Group)
11.40 - 12.00pm	Facial image comparison performance in an operational setting	David Dick (DIBP)
12.00 - 12.20pm	Low cost, high security, private, identification	Kevin Cox (WLPC)
12.20 - 1.30 Lunch		
<b>Session 2</b>		
1.30 - 1.50pm	The UNSW Face Test: An Australia-wide test of superior face identification ability	David White (UNSW)
1.50 - 2.10pm	An update of APO forensic reports	Patricia Moss (DFAT)
2.10 - 2.30pm	The training paradox	Alice Towler (UNSW)
2.30 - 2.50pm	Unfamiliar face aptitude assessment and training	Andrew Burr (Westbourne group)
2.50 - 3.30 pm Afternoon Break		
<b>Session 3</b>		
3.30 - 5.00pm	Round Table Discussion	Chair: David White

## Roundtable Meeting

In the final session of the UFIG conference, it is customary to have a 'roundtable' meeting where we raise talking points that have either been proposed by individual members, or have arisen over the course of the meeting. In addition, this session is an opportunity to discuss the future directions of the group and any action points for the year ahead.

# Keynote Presentation 1

Monday, 12 February 2018

10.30 - 11.30am

**Reuben Moreton**

*Metropolitan Police Service*

Reuben Moreton is a forensic facial examiner for the Metropolitan Police Service and a research student at the Open University. He is an expert witness in facial image comparison and regularly attends court to give evidence on facial identification. He is a member of the Facial Identification Scientific Working Group (FISWIG), the OSAC Facial Identification Sub-committee, and is the facial comparison lead for the European Network of Forensic Science Institutes (ENFSI). He contributes to international guidelines and best practice in the reliable use of images for identification. His research seeks to understand the impact of training on unfamiliar facial comparison ability and to develop effective training strategies for facial comparison in law enforcement and forensics.

**Title:** Good practice in facial identification: Bridging the gap between academic research and practitioner working groups.

**Talk summary:** Facial identification is widely used as a means of identity determination and verification in operational settings such as investigative policing, border security and forensics. This encompasses a range of different tasks, including detailed one-to-one comparisons, reviewing candidate lists from automated systems or recognising a familiar face. There is an extensive academic literature on the theories of face processing and more recently, research on facial identification in applied settings. In the last ten years, various international practitioner-led working groups have endeavoured to create guidance and best practice in applied facial identification. The research of academics and the guidelines of working groups are operating in parallel but so far with limited interaction. This presentation will demonstrate the effectiveness of practitioner working groups and academia working together and discuss options for how this work can be progressed further.

# Keynote Presentation 2

Tuesday, 13 February 2018

9.30 - 10.30am

**Mehera San Roque and Prof. Gary Edmond**

*Faculty of Law*  
UNSW

Mehera San Roque is a Senior Lecturer in the Faculty of Law at the University of New South Wales. Her research spans evidence, feminist legal theory, law and visual culture, and surveillance studies, with an emphasis on cross-disciplinary collaborations. Recent publications have explored the admissibility and reliability of identification evidence in the criminal trial, the role of expert witnesses in the legal proceedings, and the use of interpreters in court for witnesses and jurors. She is a member of the Evidence-Based Forensics Initiative based at UNSW and sits on the Council of the Australian Academy of Forensic Sciences.

Gary Edmond is a professor in the School of Law at the University of New South Wales, where he directs the Program in Expertise, Evidence and Law, and a Research Professor (fractional) in the School of Law, Northumbria University (UK). Originally trained in the history and philosophy of science, he subsequently studied law at the University of Sydney and took a PhD in law from the University of Cambridge. An active commentator on expert evidence in Australia, England and the US and Canada; he is a member of the Council of the Australian Academy of Forensic Sciences, a member of Standards Australia's forensic science committee, Chair of the Evidence-based Forensics Initiative, a member of the editorial board of the *Australian Journal of Forensic Sciences* and served as an adviser to the Goudge *Inquiry into Pediatric Forensic Pathology in Ontario* (2007-2008). With Andrew Ligertwood, he is a co-author of *Australian Evidence: A principled approach to the common law and the uniform acts*, 6th edition (Sydney, LexisNexis, 2017). <http://www.law.unsw.edu.au/profile/gary-edmond>

**Title:** Identification and Expertise: Legal Update

**Talk summary:** This presentation will review current trends in the Australian cases involving contested identification or comparison evidence. The cases disclose a familiar set of problems and shortcomings, including inattentiveness to the risks of jury comparisons, expanded reliance on 'ad hoc experts', and incoherence in attempts to delineate boundaries between lay and expert opinion evidence. Overall, the cases continue to express the underlying limitations of the current evidentiary law, and reinforce the need to reorient the criminal justice system's approach to the admission and regulation of identification and comparison evidence.

# Abstracts: Monday Session 1

## AN UPDATE ON PHOTO MORPHING IN A REAL-WORLD ENVIRONMENT

*David Chadwick*

*Department of Foreign Affairs and Trade*

As a result of recent articles and discussions around the dangers of photo morphing in passport production, testing was undertaken in a 'real world' environment. This presentation will discuss the methodology used and the results that were obtained.

## PASSPORT FACIAL IMAGE MORPHING DETECTION USING DEEP LEARNING AND ARTEFACT ANALYSIS

*Joshua Abraham*

*Department of Immigration and Border Protection*

The ubiquitous availability of image morphing tools has opened up vulnerabilities in both identity document issuance and Automated Border Control systems. This has made the ability to detect morphed facial images a critical mechanism that requires attention from the relevant government agencies and issuing bodies. A small experiment was conducted on electronically submitted passport facial images to assess how successful the automatic detection of morphed images are using simple deep learning techniques. Experiments reveal that the cropped eye regions of passport photos contain enough information to distinguish morphed from authentic samples with a high degree of accuracy. In review of these results and the general scientific literature, simple guidelines on how human facial experts can detect morphed facial images from the analysis of reflections and artefacts within the eye regions are presented.

# Abstracts: Monday Session 2

## MAKING FACES FAMILIAR: CAN WITHIN-FACE VARIABILITY CREATED USING A PRINCIPAL COMPONENT ANALYSIS IMPROVE UNFAMILIAR FACE IDENTIFICATION?

*Tamara Gradden*

*School of Psychology, UNSW Australia*

Face identification in forensic contexts is problematic due to unfamiliarity. This study investigated whether it is possible to simulate familiarity, and hence increase recognition accuracy, by computing novel instances of the face using a principal component analysis (PCA) to reconstruct face images from photographs. This was tested in tasks of unfamiliar face memory (experiment 1) and unfamiliar face matching (experiment 2). Compared to average images, performance improved when five different photographs of an identity were shown, but adding novel PCA-reconstructions did not further improve performance. This study was the first to use this method in an attempt to increase within-face variability where few images are available.

## DOES IMAGE QUALITY AFFECT RESPONSE BIAS?

*Harold Hill*

*School of Psychology, University of Wollongong*

Does image quality affect response bias for same/different identity matching decisions? While poorer image quality would be expected to lower sensitivity, it is less clear what effect it would have on response bias, if any. Observers took part in a same/different identity matching task, where one of the images was always a high quality mugshot, while the other was either a relatively high or relatively poor quality CCTV image. In the primary experiment reported, quality was objectively defined by adding 33% (high quality) or 67% (low quality) noise to the original CCTV image. Results showed a significant tendency for participants to adopt a more conservative decision criterion - be less willing to respond "same" - when the comparison image was of poorer quality. However, variability between individual observers was much greater than variability due to comparison image quality, with large individual differences in willingness to respond "same". Implications for an optimal strategy when matching low quality images and for how to define decision criterion when sensitivity varies are considered.

## QUANTIFYING IMAGE QUALITY

*Glenn Porter*

*School of Behavioural, Cognitive and Social Sciences, University of New England*

The analysis of images for the purpose of producing forensic evidence has increased exponentially with the advent of CCTV and digital cameras in smart phones. Elements of photointerpretation, especially when used as evidence within the criminal justice system, often require the forensic practitioner to have an understanding of image quality. The quantification and/or explanation of image quality is often complex and can be problematic for experts using sourced photographic material. This paper is designed to explain concepts associated with image quality and will unpack terminology involving resolution, contrast, colour, fidelity, tonal range, lighting quality, perspective and other representational aspects of photographic evidence.

# Abstracts: Monday Session 3

## VISUAL BEHAVIOUR AND DECISION-MAKING IN LINEUP IDENTIFICATION TASKS.

*Celine van Golde and Shivani Dewan*

*School of Psychology, The University of Sydney*

Upon witnessing a crime, eyewitnesses are often asked to identify the perpetrator from a line-up. Consequently, a eyewitness will make one of three decisions: identify the suspect as the perpetrator (ideally leading to a conviction), identify a known-innocent foil as the culprit, or not identify anyone (ideally indicating the suspect in the line-up is not the perpetrator). Yet errors in identification do occur, and subsequently research has focused on the processes that guide eyewitness' decision-making. Although sparsely studied, visual behaviour may be relevant to understanding identification decision-making. Thus far, only two studies have explored identification accuracy through eye-tracking, yielding inconsistent results regarding whether visual behaviour can distinguish between accurate and inaccurate witnesses. The present study aimed to examine visual behaviour and decision-making of accurate and inaccurate witnesses in a line-up identification task. Overall, the findings have practical implications on real line-up tasks such that law enforcement officials may be able to gauge the accuracy of an identification decision using an objection marker such as visual behaviour.

## **POLICE BODY WORN CAMERAS: POLICY AND RESEARCH**

*Richard Kemp and Christel Macdonald  
School of Psychology, UNSW Australia*

**P**olice jurisdictions in Australia and many other areas of the world are rapidly moving to adopt Police Body Worn Cameras to record police interactions with the public. In this paper we will describe differences in the policies developed by different jurisdictions to cover the use of the images produced by these systems, and describe some early research on the impact of these recordings on memory for an event. We will end by inviting discussion of our future research plans.

## **DUAL-TARGET COST WHEN SEARCHING FOR FACES IN A CROWD**

*James Dunn, Richard Kemp and David White  
School of Psychology, UNSW Australia*

**P**olice and security forces are often required to monitor crowded spaces for the presence of known individuals who may pose a threat to safety. Here, we simulated this visual search task to examine the effect of increasing the number of search targets. For unfamiliar targets, we found that searches took longer to complete and were more error-prone with two targets compared to just one. However, this relationship was significantly weaker when searching for familiar faces. We consider some practical implications and future directions for this research.

## **AS UNIQUE AS A SNOWFLAKE: EXAMINING THE IMPORTANCE OF RARE FEATURES IN MATCH-MAKING DECISIONS**

*Bethany Grows  
School of Psychology, UNSW Australia*

**D**iagnostic information is important when making ‘match’ decisions - the rare features in evidence are, the more likely they are to indicate that two samples of evidence are from the same source. Over the course of their work, forensic examiners are exposed to many evidence exemplars and are likely to learn how rare or common features are in that evidence. This knowledge may contribute to their improved pattern-matching performance in comparison to novices. We present evidence examining whether individuals are able to learn how rare or common features are after exposure to complex pattern exemplars and whether this learning improves pattern-matching accuracy.

# Abstracts: Tuesday Session 1

## FACE RESEARCH AT THE DEFENCE SCIENCE AND TECHNOLOGY GROUP: 2018 UPDATE

*Rebecca Heyer*

*Defence Science and Technology Group*

This talk will provide a summary of the '17/'18 program of unfamiliar face research within the Biometrics team at DTSG. A general overview of the wider work program within the group (encompassing both the human and technical/algorithm sides) will be provided. However, the talk will focus on recently completed projects in the area of facial image manipulation detection and matching, the impact of cosmetics, and training evaluation, as well as provide an overview of planned projects for 2018.

## FINDINGS FROM AN EXAMINATION OF PRACTITIONER AND ALGORITHM PERFORMANCE WHEN COMPARING FACIAL IMAGES OF CHILDREN

*Dana Michalski*

*Defence Science and Technology Group*

Anecdotally, it has been claimed by practitioners that conducting facial comparisons on images of children is more difficult than on images of adults, and becomes even more difficult the younger the child is in an image. Similar claims have also been made about facial recognition algorithms. However, there has been a lack of research examining practitioners and algorithms when conducting facial comparisons on images of children. This leaves questions regarding whether such beliefs are accurate and to what extent performance varies across childhood. Findings from a PhD-level program will be discussed that aimed to address these knowledge gaps.

## FACIAL IMAGE COMPARISON PERFORMANCE IN AN OPERATIONAL SETTING

*David Dick*

*Department of Immigration and Border Protection*

Facial image comparison is the task of comparing two or more facial images and making a 'match' or 'no match' decision. Recent research has found large individual differences in facial image comparison performance across a range of scenarios, with both trained and untrained participants. The media have been quick to assume that these findings equate to performance of facial image comparison specialists in the operational setting, even though the research has not been designed to do so. In an attempt to address this issue, we present operational performance data for the Department of Immigration and Border Protection's Facial Image Comparison Unit, collected during a 12-month review where excess of half a million comparisons were made involving a forced choice decision of 'match' or 'no match'. A total of 79 errors were

made during the 12-month review, equating to an error rate of 0.13% of all enrolments, much lower than that reported in the facial image comparison literature. We discuss the source of the errors, the reasons for the disparity in performance reported in the literature versus the operational setting, and challenged for the future error rate testing of facial image comparison specialists.

## LOW COST, HIGH SECURITY, PRIVATE, IDENTIFICATION

*Kevin Cox*

*White Label Personal Clouds*

**W**hite Label Personal Clouds uses context to lower costs, increase security, and address privacy concerns from face identification. The system works seamlessly with existing systems and can be deployed incrementally for a low cost. Individuals identify themselves using previous successful identifications. If another person attempts to steal an identity theirs is an unfamiliar face.

# Abstracts: Tuesday Session 2

## THE UNSW FACE TEST: AN AUSTRALIA-WIDE TEST OF SUPERIOR FACE IDENTIFICATION ABILITY

*David White, James Dunn and Stephanie Summersby*

*School of Psychology, UNSW Australia*

**T**here is an increased interest in people with superior abilities in face identification, known as ‘Super-recognisers’. However, standardised tests of face identification ability are not able- nor designed to- discriminate between the highest levels of performance. Recently, we used this challenging test to benchmark superior abilities of five TV ‘contestants’, selected on the basis of near-perfect accuracy on existing tests, against the Australian population. Preliminary data show a very large range of performance, even amongst those individuals who meet accepted criteria for super-recognition. In the second half, I will compare performance of the TV contestants to professional facial comparison experts on tests of facial image comparison. These results strongly suggest that super-recognisers and forensic experts rely on different processes when identifying faces.

## AN UPDATE OF APO FORENSIC REPORTS

*Patricia Moss*

*Department of Foreign Affairs and Trade*

## THE TRAINING PARADOX

*Alice Towler*

*School of Psychology, UNSW Australia*

There is now overwhelming empirical evidence that professional facial comparison training does not improve facial identification accuracy. This finding reveals a training paradox. How can facial examiners have superior face identification accuracy if training doesn't work? And, if examiners are good despite training that doesn't work, why aren't facial reviewers just as good? Here, I outline ongoing research investigating explanations for this training paradox.

## SUPPORTING APTITUDE, ASSESSMENT AND TRAINING FOR UNFAMILIAR FACES

*Andrew Burr*

*Westbourne Group*

The UNSW School of Psychology and The Westbourne Group have collaborated to create an online portal, making available unfamiliar face tests. This portal provides organisations the facility to have staff, and candidate staff, undertake standardised tests (GFMT and EFCT) designed by researchers at UNSW. After completing the tests, researchers analyse the results and provide feedback on the capability of each test participant. The hope is that such a system may be used to assist organisations in the process of identifying high performing face matchers during recruitment, or ongoing training assessment in an established group.

This discussion aims to engage with potential users of a system such as this on issues such as:

- **Data sharing and ownership:** Is it acceptable for data generated as part of an aptitude test to also be used for research purposes?
- **Applicability:** How do organisations currently identify candidate staff? Is a tool such as this useful for identifying candidates? What is required to make the system more applicable to the task of screening and assessment?
- **Information:** What data needs to be created by the system? What information is required to support recruitment decisions?
- **Privacy:** What concerns are there in relation to privacy (both for participants and organisations)?

# Meeting Organisers

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# UFIG2018 presented by:



**UNSW**  
SYDNEY



# Attending organisations include:

## Government and Industry

- Aervision Technologies Pty Ltd.
- Attorney-General's Department
- Australian Criminal Intelligence Commission
- Australian Federal Police
- Australian Passport Office
- Biometix Pty Ltd
- Cognitec Systems Pty Ltd
- Defence Science and Technology Group
- Department of Foreign Affairs and Trade
- Department of Home Affairs
- Department of Human Services
- Department of Immigration and Border Protection
- Identity Matters Consulting
- National Institute of Standards and Technology
- NEC Australia Pty Ltd
- NSW Police Force
- Queensland Police Service
- The Westbourne Group
- Victoria Police Forensic Services
- Victoria Police

## Academic Institutions

- Macquarie University
- University of Adelaide
- University of Queensland
- University of Sydney
- University of Western Australia
- University of Wollongong
- University of New England
- Western Sydney University

