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BAHID 2018 Team

BAHID Honorary President Elect: Dr John Clark

BAHID Officers: Leigh Evans (Hon. Secretary), Kerry-Ann Milic (Hon. Treasurer)

BAHID Conference Organising Committee: Leigh Evans, Kerry-Ann Milic, Carole Davenport (Membership Secretary), Kathryn Sloper, Steven Walden, Rose Drew, Benedict Rodbourne, Esther Poulus, Dave Ridgewell, Mike Conway and Roos Eisma (Web Editor).

BAHID Student volunteers: Alejandra Borg, Rebecca Dreyer, Jacob Jackson and Sarah Ormsby

Programme cover design: Rebecca Dreyer

BAFA 2018 Team

BAFA Chair: Julie Roberts

BAFA Organising Committee: Julie Roberts, Linda Ainscough, Heather Bonney, Jan Bikker, Nicholas Marquez-Grant, Helen Langstaff, Claire Fitton and Amy Rattenbury

BAHID President's Welcome

'As the incoming President of BAHID the first duty ascribed to me is to write a message of welcome to this our Winter Meeting in Manchester. It is something I am very happy to do, even if the page is only likely to be quickly scanned over on the way to the programme proper.

It is a year since the last meeting and so there will be much to catch up on, both socially and professionally. And the latter is the general theme of the meeting as it looks at technological advances in the wide range of activities and interests which characterise the membership of the association. Some areas of the forensic sciences develop far more quickly than others, the contrast between, for example, digital analysis or DNA profiling and my own specialty being very much a case in point. We forensic pathologists are little further forward from 100 or more years ago in terms of establishing such important matters as time of death and mechanism of injury.

Our speakers this weekend will show us where things are moving, as they update us on developments in the workings of DVI teams, fingerprints (I thought they were called something else now), the increasing use of drones at crime scenes, burial detection, imaging and detection methods, and much more. Presentations will be from established and senior figures in their respective fields, as much as from those just starting out and developing their own research interests. All are equally valued.

As an antidote to such promising advances, the day will finish with a reminder that fancy equipment and clever methods are not always available or even appropriate. The purpose of this session is still a positive one, however to perhaps share some ideas on how to cope practically in certain situations and what simple things sometimes work well.

Like myself, a number of attendees will be fairly new to the Association but I hope that you still make the most of the expertise and contacts which you will find around you. For the established members please make sure that no-one gets left out, and for the newer ones please do not be backwards in coming forwards. Career pathways can start with the casual conversations of such events, and so please enjoy the weekend and go away all the more enthused. Being now much and mainly involved in international work, I offer a particular warm welcome to our members and guests from further afield. Your interest in joining with us, and the extra effort necessary for you to get here are well noted and appreciated.

I will end by paying tribute to our previous President Dick Shepherd who was a great figurehead for BAHID and who is therefore not an easy act to follow. I will try my best.'

Dr John Clark

BAHID Honorary President Elect



Timetable of Events

Friday 7th December

- 19:00 – late** Evening drop-in in the main lounge at the Chancellors Hotel. All delegates are welcome to attend.
- 20:00 – 22:00** Buffet served in the CP Scott Foyer and CP Scott Room, which is accessed through the bar area. Attendees are asked to purchase a ticket in advance.

Saturday 8th December

- 08:45 - 09:15** **Registration and Coffee**
The registration desk will be placed outside the Flowers theatre; coffee will be available in the Flowers Foyer.
- Session 1** **Chair: Rose Drew**
- 09:15 - 09:20 Welcome to the Spring Conference by Leigh Evans, BAHID Secretary
- 09:20 - 09:30 Introduction to the Spring Conference by Dr John Clark, BAHID President
- 09:30 - 10:15 Keynote Speaker: George Maat – Mass Disaster Victim Identification. The Dutch Approach
- 10:15 - 11:15 Keynote Speaker: Phil Gilhooley – “Fingerprints - A Whorld Wind Tour”
- 11:15 - 11.30** **Tea/Coffee in the Flowers Foyer**
Please take this time to view the Poster presentations in the Flowers Theatre
- Session 2** **Chair: Carole Davenport**
- 11.30 - 11.50 Gowri Vijay Reesu* – 3-Dimensional Imaging as an aid to human dental identification
- 11.50 - 12.10 Elizabeth Parrott* – Still droning on? The use of unmanned aerial vehicles for indoor crime scene reconstruction
- 12:10 - 12:30 Rose Drew and Gwyn Madden – Finding Baby Anne: Life and Death in Oslo’s Workhouse
- 12.30 - 13.30** **Buffet Lunch in the restaurant**
Please take this time to view the Poster presentations in the Flowers Theatre
- Session 3** **Chair:**
- 13:30 - 13:50 Catherine Maidment* – A preliminary investigation into the use of alternative light sources to detect animal bone underwater
- 13:50 - 14:10 Jessica Liu* – Application of conditions for machine-based face recognition
- 14:10 - 14:40 Samantha De Simone and Martin Smith – Getting the full picture: exploring relationships between decisions and outcomes when applying

SfM (Structure for Motion) for the recording and analysis of skeletal remains

14:40 - 15:10

Tea/Coffee in the Flowers Foyer

Please take this time to view the Poster presentations in the Flowers Theatre

Session 4

Chair:

15.10 - 15:30

John Clark – The antidote to technology

15:30 - 16:30

Kerry Ann Milic and Carole Davenport – “Thinking outside the box: Finding solutions when the technology is not available”

16:30 - 16:45

Workshop roundup and discussion

16:45 - 17:00

Closing remarks with Honorary President, Dick Shepherd, followed by the announcement of the student presentation prize winners

Approx. 17:00

BAHID Annual General Meeting – N.B. would all those present who are **not** BAHID members please excuse themselves from the Flowers Theatre at this stage during Association business

BAHID Council Meeting – Council members only

19:00 - 20:00

Wine and drinks reception in the main lounge

20:00 - late

Dinner in the Chancellors main restaurant, followed by drinks in the lounge

* Student presentation entries



BAFA CONFERENCE – Sunday



Timetable of Events

Sunday 9th December

09:00 - 10:00

BAFA Members Meeting – AGM

10:00 - 11:00

Dr Julie Roberts, Cellmark Forensic Services and Chair of BAFA – Career development and opportunities

Dr Sarah Ellingham, ICRC – Taking the first steps: building a career in the Humanitarian sector

11:00 - 11:15

Coffee and Biscuits

11.15 - 13:15

Practical Workshop – Species Identification

13:15 - 14:00

Mentorship and building a portfolio – RAI certification Q and A session

14:00

Close of Workshop

14:00 onwards

Late Lunch

Speaker Abstracts

Keynote: George Maat and Hans de Boer

Mass Disaster Victim Identification. The Dutch Approach.

ABSTRACT: A disaster is a sudden calamitous event that seriously disrupts the functioning of a society and causes human, material and economic losses. Often disasters coincide with the loss of numerous lives. The recovery, identification and repatriation of the remains of victims are vital to the mourning process of the relatives and are needed for legal clearing. All efforts made for this purpose are referred to as Disaster Victim Identification (DVI). Over the past decades, the Dutch DVI team has made several contributions to increase the efficiency of the internationally accepted Interpol DVI-procedures. This presentation offers, from a medical officer's point of view, the basics of a disaster victim identification response and discusses some recent methodological advances used by the Dutch DVI team. The approach is exemplified by the 2014 Ukraine airplane disaster identification processing.

KEY WORDS: Disaster Victim Identification, Pathology, Medical Examiner

BIOGRAPHY: George Maat studied medicine at Leiden University in Holland, became MD in 1973 and defended his PhD-thesis at the same university in 1974. Thereafter he has worked as an anatomist at Surinam University (1974-1976), Leiden University (1977-1986), Kuwait University (1986-1990), Utrecht University (1991-1993) and again at Leiden University Medical Center since 1993. In addition to teaching human anatomy, embryology and histology he has been teaching physical anthropology since 1977. From 2004-2011 he lectured forensic anthropology in the Forensic Human Identification Course at the University College London, and from 2007 he has been appointed as an honorary professor at the Department of Anatomy at the University of Pretoria. His fields of research are paleopathology and forensic anthropology. He has been eight years editor of the International Journal of Osteoarchaeology. Up to 2011 he was affiliated with the Netherlands Forensic Institute at The Hague. As permanent member of the Dutch Disaster Identification Team and as a temporary member of the British Forensic Team he has been deployed in Kosovo (ICTY; 1999, 2000, 2003), Enschede (fireworks disaster; 2000), Thailand (tsunami; 2004-2005), Afghanistan (military helicopter crash; 2006), Surinam (airplane crashes 1989 and 2007, Tripoli (airplane crash 2010) and in the Netherlands (MH-17 Ukraine airplane crash 2014. Since 2009 he is chairman of the Scientific Steering Committee of the International Commission on Missing Persons.

Prof. George JR Maat MD, Leiden University Medical Center

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Keynote: Phil Gilhooley

"Fingerprints – A Whorld Wind Tour"

ABSTRACT: Every person has unique fingerprints, which persist throughout life from before birth until after death. A fingerprint examiner will evaluate two areas of ridge detail by comparing such features as ridge characteristics, the position and shape of sweat pores, the shape and physical make-up of the ridges and any other physical feature that the examiner sees in the two impressions to assist the evaluation. When a Fingerprint Examiner finds the

same features, in sufficient number and in the same coincident sequence, which is bearing the same relationship to each other in both impressions, then identity is clearly and conclusively established.

For over 100 years, fingerprints have been accepted as the most reliable forms of human identification and accepted by Criminal and Civil Courts throughout the world, unchallenged. Some recent mistakes by Fingerprint Practitioners recorded both nationally and internationally have led Professionals in the Legal system to test and challenge fingerprint evidence adduced by the Crown.

This presentation will show, by examples of real casework, how fingerprint evidence can provide crucial evidence in the investigative process but also can be discredited and lose the trust people, in the Judicial process, have in it. The presentation will include the career path of the presenter from Crown witness to independent witness and demonstrate the passion they have that Forensic evidence is such an integral and important part of the Investigative and judicial process.

KEY WORDS: Fingerprints, Expert Witness, Judicial Process

BIOGRAPHY: With over 50 years' experience in the field of fingerprint identification, Philip Gilhooley is an internationally recognised fingerprint expert. Philip started his career with the Merseyside Police in 1964, qualifying as a nationally registered fingerprint expert in 1970. He progressed through promotion to the post of Principal Fingerprint Officer, and Deputy Head of Bureau, in 1992. In April 2004, Phillip was promoted to Chief Fingerprint Officer, Head of the Merseyside Police Fingerprint Bureau, one of the largest provisional fingerprint Bureaux in the Country. The role included the Management of the Forensic Laboratory and Trace Evidence Recovery Facility, specialising in the recovery of trace evidence from exhibits in gun related crime.

From 2007 until 2011 he held the position of Senior Lecturer, Forensic Science, Liverpool John Moores University, and brought over forty years practical forensic experience to Academia. Philip is qualified in Training and Development with Chartered Institute of Personnel Development. He has been involved in many high-profile criminal cases, both within the UK and abroad, having reviewed and presented reports on complex fingerprint issues. Philip is a professional member of the Chartered Society of Forensic Sciences and a Fellow of the Fingerprint Society.

Philip Gilhooley, PSL Fingerprint Consultants

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Rose Drew and Gwyn Madden

Finding Baby Anne: Life and Death in Oslo's Workhouse

ABSTRACT: Oslo amateur genealogist Jorunn Torstad traced her great-great-great-grandfather, his second wife, and newborn daughter to Tuktuset, using family oral history and the Oslo City Archives. The church register from the House of Correction still exists, and registers 510 deaths for the period 1790-1830. Torstad was also able to locate images of the handwritten transcriptions of the case that sentenced her ancestor to Tukthuset.

In 1808, Torstad's great-great-grandfather Christopher Christopersen was born. His mother died. At age one, he was left with relatives when his father Christopher Nielsen and new partner Berit Knudsdatter travelled to Oslo. They ended up in Tukthuset, allegedly for stealing a bag of grain. Nielsen died age 48 on 21 August 1809; Knudsdatter gave birth around 4 October and died 8 October. Infant Anne died age 10 days, about 14 October. All were buried in the workhouse churchyard. Their names and death dates, and proceedings from the magistrate's trial that sent the adults to Tukthuset, are in the archives.

The collection includes one complete neonate. Torstad has requested the opportunity to provide DNA for kinship studies, with the hope of enabling potential identification of a workhouse individual and adding a poignant human dimension to this archaeological assemblage.

KEY WORDS: Genealogy, Forensic archaeology, Identification.

BIOGRAPHY:

Over the past 20 years, Rose Drew has studied approximately 2000 archaeologically obtained human skeletons, prehistoric to modern: Inca, Taino, Plains American Indian; Roman, medieval, Tudor and early modern from Britain; Vikings and 19th century Norwegians; and documented modern Cypriots. Rose has applied for her FAIII Certification and is working toward her FAII with Tal Simmons. One of Rose's interests is recognizing physical impairment in archaeological skeletons. Another interest, indeed an obsession which formed her postgraduate research, has been helping museums get a handle on their holdings of human skeletal remains by devising and testing a novice-focused assessment protocol. Rose spent nearly three years studying skeletal remains from the Tudor warship Mary Rose and has received periodic forensic training since 2001. Rose earned her BSc with Charter Oak State College; obtained her Masters from Yale; and her PhD from University of Winchester, UK. Rose is a Council Member for BAHID.

Dr Rose Drew

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Samantha De Simone and Martin Smith

Getting the Full Picture: exploring relationships between decisions and outcomes when applying SfM (Structure from Motion) for the recording and analysis of skeletal remains

ABSTRACT: In the context of mass disasters and human rights violations, human remains may be deposited in complex patterns with high degrees of commingling which present significant challenges both for in-situ recording of assemblages and subsequent presentation either as evidence for courts or inquiries, or in published form. The current project sets out to explore the applicability and limitations of three-dimensional virtual reconstruction produced using photogrammetric data -SfM (Structure-from-motion) for the recording of such complex skeletal assemblages. This technology clearly has significant potential to improve the presentation of such evidence, whilst also allowing the creation of a permanent record preserving physical relationships which are effectively destroyed during recovery. In order for this to be achieved it is essential to test possible methodologies of data capture and processing to ensure reliable, valid results that are admissible in a courtroom.

As part of the preliminary investigations testing different photogrammetric approaches to skeletal remains, the examiner worked on the 3-Dimensional reproduction of a human adult cranial specimen displaying signs of severe trauma, denominated the “Waddon Skull”, on behalf of the Dorset County Museum (Dorchester). The current paper presents a comparison of different photographic datasets, digital settings and processing parameters, and the relative effects these decisions have had on the respective 3-D models produced. The final step of the preliminary analysis has involved the creation of a 3-Dimensional simulated-mass grave, with considerations for the future project and the directions it will take.

KEY WORDS: Structure from Motion (SfM), 3-Dimensional techniques, Mass graves.

BIOGRAPHY:

Samantha De Simone received her master’s degree in Forensic Archaeology and Anthropology from the University of Dundee in 2017 and her bachelor’s degree with honours in Cultural Heritage from the University of Bologna in 2016. She has participated in several workshops (e.g. Gifted and Talented, in 2017 and Fullbright scholars, in 2017) and internship (General Forensic Anthropology), held by the University of Dundee. She is currently living in England where she is currently conducting her PhD at Bournemouth University in the use of Structure from Motion for the recording and resolution of commingled remains.

Samantha De Simone, Bournemouth University

Kerry-Ann Milic and Carole Davenport

“Thinking outside the box: Finding solutions when the technology is not available”

ABSTRACT: What do you do when you are deployed to an incident in a remote location and the technology used in your field is not available? Using scenarios created from real life situations on deployment, this workshop aims to put introduce you to thinking outside the box to develop solutions to technological voids. Working in teams, you will be given a series of scenarios to consider. Will your solution be similar to what was done at the incident, or will you provide a further solution to the situation should it arise again in the future? This workshop will finish with a round table discussion allowing attendees to provide their own experiences when working in the field, laboratory or in academia.

BIOGRAPHIES:

Kerry-Ann Milic is the Director of Operations for Kenyon International, responsible for the maintenance of operational capability and conducting operations in response to incidents that can occur worldwide. With over 12 years experience deploying with Kenyon International, Kerry-Ann also manages the consultancy programme and oversees the training for Team Members. Kerry-Ann was a Senior Lecturer in Forensic Science at Anglia Ruskin University until 2016 and previously worked as a Senior Forensic Anthropologist for the ICMP in Bosnia-Herzegovina, spending five years assisting in the identification do victims for secondary mass graves following the Srebrenica genocide. Her qualifications include a BSc with honours in Forensic Science from Anglia Ruskin University (Cambridge), an MSc in Advanced Study in Forensic Anthropology in 2004 from the University of Bradford and she is in the process of completing her Ph.D. She has a PGCert in Teaching and Learning and is a qualified Forensic Anthropologist, accredited by the Royal Anthropological Institute (FA-III). Kerry-Ann is also an

assessor for the Chartered Society of Forensic Sciences, is registered on the SOCA Police Expert Witness Database for consultation in her areas of expertise and is a Council Officer (Treasurer) for the British Association of Human Identification (BAHID).

Carole Davenport is an accredited Forensic Anthropologist through the Royal Anthropological Society (FA-III) and active researcher in taphonomic changes to human skeletal remains with collaboration both within the UK and abroad. She completed her PhD in Physical/Biological Anthropology at Liverpool John Moores University in 2018, and has since been working for the university providing academic support to students and staff. As an active researcher, her interests lie in the areas of forensic taphonomy, developing new search techniques to help the location of clandestine burials and non-adult aging. Carole is a Guest Lecturer in Forensic Anthropology for the University of West London, a member of several organisations including the CIFA Forensic Archaeology Special Interest Group (FA-SIG), BAFA and the Society for the Study of Human Biology, a Fellow of the Royal Anthropological Institute and the Membership Secretary for BAHID.

Student Oral Presentation Abstracts

Gowri Vijay Reesu*

3-Dimensional Imaging as an Aid to Human Dental Identification

ABSTRACT: Dental Identification is the most common area in forensic odontology and central to disaster victim identification. Smile photographs have also been used in human identification in the past by a method where an AM photograph of victim's anterior teeth in a smile was critically compared with the anterior dentition of the deceased post-mortem photograph in an effort to facilitate the identification process.

Technological advances in 3-dimensional imaging enable useful techniques for the interpretation of smile photographs with human identification purposes. Facilities such as 3D imaging technologies have spawned new applications in dentistry. Using a laser scanner, plaster models can be converted into 3D dental images that may be viewed in any preferred orientation and subjected to quantitative analysis.

Aim: To investigate odontological methods by comparing 3D dental models with 2D digital photographs. **Materials and Methods:** Randomly selected 35 smiling photographs of patients consented to participate in research in the Orthodontics Department, Dundee Dental Hospital. The smiling portion in the images were cropped and archived and were considered as AM images. 31 dental casts of the same photographic sample were retrieved from the orthodontic laboratory which were archived for treatment purpose. All the dental casts were laser scanned to create indirect 3D digital images of dental models and considered as PM digital models. The smile photographs showing upper and lower front (canine to canine) teeth were compared with the 3D dental models using 3D Rhinoceros software. This study was conducted in two phases: Direct Visual Comparison and 2D-3D superimposition. The opinions were reached based on the Interpol DVI guidelines: Identity Established, Probable, Possible and Exclusion. **Results:** In summary, it was possible to reach a conclusion in more cases when using the 3D

comparison software, and those conclusions expressed a higher degree of certainty which is the crux of this study as to whether the 3D comparison software adds significant value.

KEY WORDS: 3-dimensional imaging, Forensic Dental Identification, Smile Photographs.

BIOGRAPHY: Gowri Vijay Reesu is currently a PhD Researcher at the University of Dundee in forensic odontology. He qualified as a Forensic Odontologist from the University of Glamorgan, Cardiff in 2011. After returning to India, he started his career as the first government appointed Forensic Odontologist at Maulana Azad Institute of Dental Sciences, New Delhi to set up the forensic odontology department and teaching the subject to dental students. He was involved in solving the medico-legal- forensic cases in Delhi.

Gowri Vijay Reesu, Centre for Forensic and Legal Medicine and Dentistry, University of Dundee

Elizabeth Parrott*

Still droning on? The use of unmanned aerial vehicles for indoor crime scene reconstruction

ABSTRACT: The use of unmanned aerial vehicles (UAVs) is expanding rapidly within policing and forensics worldwide as a valuable tool for recording large-scale outdoor sites using orthomosaic and three-dimensional (3D) modelling. As UAV technology further advances, discussion has already begun to deploy small UAVs within indoor environments by either the police or forensic services as an aid for situational awareness, tactical operation as well as scene recording. With this in mind, the focus of this work is to provide a novel solution to efficiently record and reconstruct active indoor crime scenes by reducing human intervention and potential contamination risk, with the use of an unmanned vehicle. A custom UAV device was flown through a simulated crime scene and a 3D model was generated to mimic the workflow of practitioners and provide a true insight into the practicality of small UAVs as a forensic investigation tool. To date, there has been little consideration given to the potential effects of using UAVs within active indoor crime scenes aside from a legislation point of view. However, as recognised during these experiments 3D reconstruction quality is directly linked to the resolution of captured images, therefore, close proximity flights are required for more detailed models which questions the effectiveness of UAV technology at maintaining scene integrity due to propeller downwash. The aim of this initial study is to give practitioners an insight into the technology and procedures to use when operating within confined spaces as well as recognizing some of the issues caused by UAVs within active crime scenes.

KEY WORDS: Drone, UAV, 3D Modelling, Crime Scene, Reconstruction

BIOGRAPHY: Elizabeth Parrott is a cross faculty PhD student at Liverpool John Moores University working within the fields of engineering and policing focussing upon the use of drone technology within policing and forensic science.

Elizabeth Parrott, Liverpool John Moores University

Catherine Maidment*

A preliminary investigation into the use of alternative light sources to detect animal bone underwater

ABSTRACT: Aquatic searches for human remains are time-consuming and expensive, with current methodologies focusing on intact cadavers rather than skeletal remains. Alternative light sources (ALS) are potentially an effective method for searching for skeletal remains underwater, as they are non-destructive, produce immediate results and are relatively inexpensive. They utilise the autofluorescence properties of bone, which current literature suggests is due to high collagen content. In this study, 17 porcine bones were placed in air, exposed to blue light (450nm) and photographed using coloured filters. 8 organic and inorganic items were used as negative and positive controls. Then, 15 porcine humeri were placed in air and in canal water, seawater and fresh water, for 21 days and photographed at 7-day intervals using the same light source and filters. Measurements including pH, turbidity, conductivity and Total Dissolved Solids were taken. Fluorescence was analysed using a bespoke node Javascript program, with thermogravimetric analysis to quantify collagen. Orange and yellow filters provided the best results, and significant relationships were noted between collagen per 1mg and fluorescence with the orange filter ($R=0.260$, $p=0.033$), interval and collagen loss in sea water ($R=0.962$, $p=0.019$) and canal water ($R=0.925$, $p=0.038$), as well as conductivity and collagen loss in the canal water ($R=0.901$, $p=0.05$) and fresh water ($R=0.999$, $p=0.000$). Overall, this research yielded some promising results with potential implications for crime scene, mass disasters and archaeological contexts as well as highlighting pathways for future studies.

KEY WORDS: Alternative Light Sources, Aquatic search, Forensic Anthropology, Fluorescence, Collagen

BIOGRAPHY: Catherine Maidment is a first year PhD student currently studying forensic science/forensic anthropology at the University of Huddersfield. She has a BSc in Death Investigation from Teesside University and a MSc in Forensic science (Forensic anthropology) from the University of Huddersfield. She has also spent approximately 7 years working within scientific environments including histology laboratories, a hospital mortuary and a university setting. Key areas of interest include forensic anthropology, disaster victim identification and crime scene science.

Catherine Maidment, University of Huddersfield

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CY Jessica Liu*

Application of conditions for machine-based face recognition

ABSTRACT: In 2015, the National Centre for Missing and Exploited Children have assisted in the identification of 2,589 victims related to indecent images of children. In relation to the vast number of images received, machine-based facial recognition could help law enforcement and other organisations to match faces more efficiently. With growth related changes, juvenile face recognition is challenging. This study tested how different conditions (i.e. blurring, resolution reduction, cropping, and black and white) can affect machine-based

facial recognition. The results suggested a reduction of the resolution of an age progression image improves automated facial recognition for juvenile identification. The relationship between age progression images and facial recognition software was also explored, with the result suggesting manual age progressions are no more useful than the original image for facial identification of missing children.

KEY WORDS: Facial identification; juvenile age progression; face recognition

BIOGRAPHY: Jessica is a final year PhD student between the Department of Computer Science and FaceLab at Liverpool John Moores University. She completed her BSc (Hons) in Forensic Anthropology and MSc in Forensic Facial Identification at the Centre for Anatomy and Human Identification (CAHID) at the University of Dundee. Her current research is focused on Facial Identification from on-line images for use in the prevention of child trafficking and exploitation. As a researcher within Face Lab, she regularly participates in the production of facial reconstructions from skeletal remains for both archaeological and forensic identification purposes.

CY Jessica Liu, Liverpool John Moores University

***Presentations are student prize eligible.**

Poster Presentation Abstracts

Tara Blackburn* and Amanda Boddis – Liverpool John Moores University

Detection of Latent Fingerprints from Nitrile Gloves Using a White Powder Suspension

ABSTRACT: This investigation was carried out because gloves are being worn by criminals in order to hide their fingerprints at crime scenes and therefore making it harder for forensic scientists to identify the culprit. This poster presents a summary of the investigation which involved thirteen participants who wore black nitrile gloves for a set time, after which were inverted upon removal. The gloves were then developed with a white powder suspension, which was applied to the fingertips of the nitrile gloves to develop the latent fingerprints into visible patent fingermarks.

All of the developed gloves were visualised under a video spectral comparator to magnify and produce high contrast images of each fingermark. Where it could be clearly seen that the white powder suspension produced excellent, clear friction ridge detail. From the results, 88.7% displayed a partial or a full print. Of those fingermarks, first and second level detail were displayed, with a number of those fingermarks also displaying third level detail pores.

Control prints of participants were also taken. These were compared against the developed print, using the ACE-V and point system, to establish whether good comparisons or identifications could be made between the fingermarks. The results indicated that the powder

suspension does produce visible fingermarks on nitrile gloves, and suggest that the developed fingermarks can be identifiable.

KEYWORDS: Fingerprints, ACE-V, Gloves, Forensics

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Alejandra Borg and Jacob Jackson* – University of Central Lancashire

A Preliminary Investigation of a Commingled Skeletal Sample from the Maltese National Museum of Archaeology

ABSTRACT: Study of human skeletal remains is an important part of interdisciplinary investigation to reconstruct the biological history of ancient individuals and populations. Analysis of the indicators of biological characteristics (incl. ancestry, stature, sex, age-at-death) as well as diet, pathological conditions and stress (caused by strenuous physical activity) can increase the amount of data that can be gathered from archaeological contexts. The study focused on a preliminary analysis of skeletal remains housed in Malta at the National Museum of Archaeology. The commingled remains came from seven different sites (Rabat, Attard, Qrendi, Għajn Tuffieħa, Ta' Qali, Tarxien, Birkirkara) excavated between the 1950s and 1980s. Additional osteological material without provenance was also examined. Initial inventory was taken to highlight percentage completeness, level of preservation and taphonomic modifications of the bones. The minimum number of individuals confirmed that the remains of 147 individuals were present. A preliminary division between adult and sub-adult skeletons was performed, and subsequently a metric analysis was used to determine sex and estimate mean stature. Palaeopathological evaluation established that osteoarthritis was the most common condition observed within the population studied. Enthesophytes and heel spurs were also observed in abundance, indicating the individuals performed strenuous and repetitive activities. This preliminary analysis was performed at Liverpool John Moores as part of a final year research project. The implementation of the inventory process is planned to allocate, if possible, the skeletal elements to each different individual. However, this pilot study provides a first look into the potential of the extensive Maltese skeletal collection.

KEYWORDS: MNI, commingled human skeletal remains, Malta

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Rebecca Dreyer* and David Jordan – Liverpool John Moores University

The potential use of soil sampling to locate graves

ABSTRACT: Numerous methods are used in the search of clandestine and mass graves. Such methods often involve physical searches for changes in appearance and growth of vegetation in the landscape. This pilot study used soil sampling and portable X-Ray Fluorescence (pXRF) to determine their usefulness in the detection of leachate movement from graves. Pumpkins filled with bone meal were buried 0.5m deep in a grave of 2m by 1m in peat soil and left to decay over eight months with soil samples taken and analysed prior to burial and throughout the study. Soil samples were tested in a lab setting for pH levels and elemental composition with pXRF. Results show that pXRF was useful on the samples both at field moisture content as well as on dried samples for detecting differences in elemental composition throughout the study. Certain elements were detected at higher levels at field moisture content whilst others

had higher levels once the samples were dried, indicating that if looking for changes of those elements there might be a preferred moisture content to ease the detection if very low levels are present. pH analysis of the soils showed changes in pH following the burial of the pumpkins. Recommendations include trialling these methods on different soil types, buried objects, and size of burial. Also recommended is further testing over a longer timeframe with more frequent sample collection.

KEYWORDS: pXRF, search, soil samples, grave, decomposition

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Chloe Hetherington* – Liverpool John Moores University

*The influence of decomposition on the development of *Muscina stabulans* (Fallén)
Diptera: Muscidae*

ABSTRACT: When calculating minimum postmortem interval (PMI_{min}) estimations there is often the assumption that flies have access to remains almost immediately, however, this is often not the case and access may only be possible once the remains have been moved to a secondary location. This elapsed time allows tissues to decompose and macronutrients to break down. This research focuses on the development of *Muscina stabulans* larvae when feeding on fresh and decomposed pigs' liver and its effects on PMI_{min} estimations.

Muscina stabulans flies were reared on liver-agar containing fresh, 6-week, 14-week and 21-week decomposed liver tissues, to observe the influence of decomposition on development. Significant differences were seen in larval length, pupal numbers and fly emergence between the decomposition samples. The more decomposed samples of liver-agar produced smaller larvae, fewer pupae and fewer flies than fresher samples. Adult fly size (measured by wing cross-vein width) was significantly smaller when reared on 21-week decomposed liver when compared to the other decomposition intervals. No significant difference was seen in regards to sex. Complete lifecycle duration varied between 14 days (when reared on the fresh liver) to 25 days (when reared on 21-week decomposed liver).

KEYWORDS: Forensic Entomology, Decomposition, Taphonomy, *Muscina Stabulans*, Postmortem Interval

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Varohthini Maharaja* – Liverpool John Moores University

Analysing pre-mortem, peri-mortem, and post-mortem surface damage to bone using Scanning Electron Microscope (SEM).

ABSTRACT: The identification of peri mortem trauma out of the three common types of trauma from human skeletal remains is vital in the forensic evaluation of skeletal trauma. This research summarises the basic structure of bone and the biology of fracture healing. The aim of this research was to investigate if scanning electron microscopy (SEM) can distinguish the three types of trauma based on the morphological characteristics in an attempt to observe if peri mortem damage can be categorised into pre or post mortem damage. Here a new non-

invasive method that allow a three-dimensional reconstruction of trauma morphology by silicone based impression materials (peels) to replicate the surface damage of bones was perform as a method of analysing morphological characteristics on bone. Since pig demonstrates a good representation in bone composition between humans, this new method were tested experimentally on pig bones that were damage intentionally to provide a comparison in the nature of various bone fractures in types of trauma found in osteological collection used in the research. There were 18 partial human skeleton included for the purpose of this research. The 42 peels from human skeletal remains and 6 peels from pig bones were successfully categorised based on the types of trauma that matches the SEM image outcome. Most studies have only focused on macroscopic examination of bone morphological features. The use of SEM provided new insights on interpreting typical characteristics of bone healing with higher magnification and enhanced image quality.

KEYWORDS: macroscopic, bone trauma, bone healing, scanning electron microscopy

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Sarah K Ormsby * – Liverpool John Moores University

Macroscopic Comparison of Pre-Burnt and Post-Burnt Human Analogue Ribs for Anthropological Analysis with Computed Tomography

ABSTRACT: Crime, accident, disaster and terrorism affect us personally and globally with focus on the dead and those who survive them. A basic human right is to have an identity both in life and after death with forensic science aiming to ensure these identities. This study evaluates the capacity of computed tomography to image fire affected bone with enough clarity to enable identification of the deceased through forensic anthropological techniques. Rib bones of the pig (*Sus scrofa*) were CT (computed tomography) scanned before and after the application of heat. The images were compared to observe any differences in the potential for establishing identity. This study shows minimal differences between pre-burnt and post-burnt bones using CT imaging, which do not affect the ability to perform anthropological techniques. The issues encountered with dry bone measurements were identified with CT image, however, the risk of damage or loss to the bone during examination was decreased in the latter. This implies the addition of the CT scan at a death event involving fire will improve the chances of positive identification of the dead.

KEYWORDS: Computed Tomography, DVI, fire-affected bone, human analogue

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Megan Ivy Quick, Jim Glenister, Peter Cross, Patrick Randolph-Quinney and David Jordan – Liverpool John Moores University

The Effect of Taphonomic Changes in Burial Detectability over a One Year Period: Preliminary Results from Month 1 to Month 3

ABSTRACT: For efficiency, forensic investigations must locate buried targets quickly and accurately. Geophysical methods are not always successful in locating clandestine graves, due to variations in terrains and climates, and limited consistency between field practitioners

in the choice of geophysical methods used. The complexity of burial settings opens up an avenue for further research to improve grave detection by exploring a range of variables within a monitored environment.

The preliminary data presented here is gathered from observed research settings, whereby specific, buried targets will be monitored periodically over a 12 month period. Nine graves were constructed at the TRACES research facility near Burnley, UK in three locations of varying environments (contrasting slope, drainage, vegetation, tree density and soil typology) that mimic conditions found at body disposal sites on the basis of ease of access and concealment. Each location was comprised of three graves; one containing a naked carcass, the second a carcass wrapped in tarpaulin, and the third was left empty, but back-filled with soil. This study permitted a comparison between the effectiveness of two commonly employed geophysical methods: electrical resistivity tomography and ground penetrating radar.

Preliminary results show that the experimental burials are decomposing at different rates. The surveys have produced variable rates of success in detecting the buried remains, highlighting that care must be taken in the selection of geophysical methods. These results show the importance of controlled research to increase the effectiveness of geophysical surveys.

KEYWORDS: Geophysical methods, grave detection, clandestine

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