

Crime Scene Analysis and Victim Identification Forum

Monday, 11 March 2013

The Royal College of Pathologists, London, UK

This inaugural crime scene identification forum will comprise of expert speakers on different aspects of crime scene forensic examination.

This event has CPD accreditation and is part of the *Forensic Forums 2013 series* – www.forensicforums2013.com

Meeting chair

Professor Peter Vanezis OBE

Professor of Forensic Medical Sciences, Cameron Forensic Medical Sciences, Clinical Pharmacology, Barts and the London

- 9:00 – 9:45 **Registration**
- 9:45 – 10:15 **Introduction by the Chair:** *Professor Peter Vanezis OBE*
Professor of Forensic Medical Sciences, Cameron Forensic Medical Sciences, Clinical Pharmacology, Barts and the London
- 10:15 – 11:00 **Where is the anthropology in forensic anthropology - and does it really matter?**
Dr Tim Thompson, Teesside University, UK
This talk will attempt to draw together the history and future of forensic anthropology. It will describe the development of the subject to date, discuss the current major issues it faces while looking forward to and how the subject may develop over the next few years. At the end it will highlight how all this may impact the application of forensic anthropology in the field and forensic context more broadly.
- 11:00 – 11:30 **Speakers' photo then mid-morning break/networking and trade show**
Please try to visit all the exhibition stands during your day at this event. Not only do our sponsors enable Euroscicon to keep the registration fees competitive, but they are also here specifically to talk to you
- 11:30 – 12:15 **An Improved Tape Lifting System for the Rapid, Reliable Recovery and Analysis of Evidence from Crime Scenes**
Dr Claire Gwinnett, Staffordshire University, UK
The methods of retrieval of evidence at crime scenes are well understood. One such method called tapelifting is usefully employed to retrieve samples but can still be improved in order to reduce contamination, increase ease of use and allow analysis of evidence to be quicker and cheaper, this is particularly true for fibres evidence. Currently, there are still problems associated with the subsequent removal of evidence, such as textile fibres, involving time-consuming dissections of tape and the potential for evidence loss in the process. A new tape lifting system has been co-developed with Dr Andrew Jackson that solves these problems and allows in situ analysis. This system is compatible with existing fibre characterisation technologies, including polarized light microscopy (PLM), fluorescence microscopy, microspectrophotometry (MSP) and Raman spectroscopy, removing the need to extract evidence from the tape prior to analysis with these techniques. This new system has been tested in conjunction with Staffordshire Police in the UK and currently with The Netherlands Forensic Institute (NFI), particularly for the retrieval and analysis of fibres evidence but this new system is also compatible with other evidence types. This presentation will describe the development and use of this new system and outline the results of the testing of this new method. This presentation will also discuss how this new system will be developed to aid the analysis of serial scenes
- 12:15 – 13:15 **Lunch/networking and trade show**
This is also a good time to fill out your feedback forms and any questionnaires
- 13:15 – 14:15 **Question and Answer Session**
Delegates will be asked to submit questions to a panel of experts. Questions can be submitted before the event or on the day
- 14:15 – 14:45 **A dermatoglyphic analysis of the minutiae of the slovak population for forensic purposes**
D. Kramárová, K. Kyselíková, R. Beňuš, S. Masnicová, Z. Némethová, M. Španková
Comenius University in Bratislava, Faculty of Natural Sciences, Department of Anthropology, Mlynská dolina B2, 842 15 Bratislava, Slovakia
Fingerprints are the most widely used biometric features for person identification. The uniqueness and irregularities in their structure are considered to be legitimate proof of evidence in courts of law all over the world. For criminal

investigation special attention is given to the structure of dermatoglyphic minutiae, the minor irregularities in the course of the ridge. In our study, thirteen types of minutiae on the distal phalanges of both hands were evaluated: ridge ending, fork, fragment, dot, break, enclosure, overlap, bridge, opposed bifurcation, triple fork, dock and return. This paper presents the approach to define the minutiae types most advisable to be monitored in personal identification systems on the basis of their co-occurrence and correlation of minutiae pairs. The analyses of the frequency of dermatoglyphic patterns was done as well. The studied 1020 fingerprints came from a group of 102 individuals all of them male and from the territory of the Slovak republic. The dactyloscopic material was afforded by the Department of Dactyloscopic Identification at the Institute for Criminalistics and Expertise of the Police assembly in Bratislava, Slovakia. The fingerprints came from 14 to 51 year old individuals, the average age of the whole group was 21.77 years. The average number of minutiae observed on one finger was 89.15, while on the right hand more minutiae were observed than on the left hand. The minutiae types with the highest incidence were fork (43.02%) and ridge ending (35.94%) and the lowest incidence was observed for the opposite bifurcation (0.17%), dock (0.13%) and triple fork (0.07%). The minutia types opposite bifurcation, dock and triple fork should be therefore the most suitable for individual identification. There was a significant bilateral difference in the frequency of the minutiae types fork, dot, break and triple fork. The un-correlated minutiae pairs are: dot-enclosure, dot-bridge, dot-opposed bifurcations, dot-dock, break-dock, enclosure-crossbar, enclosure-triple fork, crossbar-opposed bifurcations, crossbar-triple fork, bridge-triple fork, opposed bifurcations-triple fork and opposed bifurcations-dock. These mentioned couples are the most suitable for personal identification. This contribution is the result of the project implementation: Center of excellence for security research, ITMS code: 26240120034, supported by the Research and development Operational Programme funded by the ERDF.

14:45– 15:15 **Afternoon Tea/Coffee, networking and trade show**

15:15– 16:00 **Missing persons and nameless cadavers: the Italian governmental solution and the role of forensic odontologists**

Emilio Nuzzolese University of Magna Graecia , Italy

In Italy, since 1st April 2010 in the 'Sistema Ricerca Scomparsi – Ri.Sc.' (*Missing Persons Search System*) database concerning missing persons and unidentified cadavers, forensic odontologists have been able to have an active role, together with the medical examiners, regarding the compilation of the 'Ri.Sc.' form in order to collate pertinent dental data and oral radiographs of the cadaver with the aim of leading towards a positive identification. The Italian data is disconcerting: approximately 25 thousand people have disappeared since 1974, with an annual growth of 800-1000 people. Out of these, 1651 are Italian children and as many as 8153 are foreign children. To date, 832 bodies have been found and still await identification.

16:00 – 16:45 **What is wrong with the current governance and legislation of the NDNAD, and what can be learned from other governance models?**

Dr Victor Toom, Leverhulme fellow, Northumbria University Centre for Forensic Science, UK

In December 2008, the European Court of Human Rights ruled in the *S. and Marper v. the UK* judgement that the indefinite retention of biological samples and DNA profiles, held in the National DNA Database of England and Wales (NDNAD), of those arrested but never convicted should be considered "a disproportionate interference with the applicants' right to respect for private life and cannot be regarded as necessary in a democratic society". The Coalition Government responded with the Protection of Freedoms Act 2012 which stipulates *inter alia* that DNA profiles from arrested but not convicted individuals may be retained for three years, with a single two-year extension available on application by a Chief Officer of Police to a District Judge. The new regime *inter alia* implies destroying biological samples and DNA profiles of approximately 1 million subjects currently held on the NDNAD illegally. Almost a year after the Royal ascent of the Protection of Freedoms Act 2012, the Act still needs to be implemented. This presentation will consider the history of the NDNAD, its governance and the current legislation, and will contrast governance and legislation of the NDNAD with developments in other European jurisdictions.

16:45 – 17:00 **Chairman's summing up**

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Keywords: Forensic Anthropology, Anatomy, Identification, Identity, Emergent Identification Technologies, DNA, collection, storage, transportation, computed tomography, identification, logistics ,dental, mortuary, pathology, Post Mortem, autopsy, anti-mortem, DNA Profiling, Lineage markers, Ethics, AF447, Commingled remains, anthropology, DNA, osteology, forensic genetics; ethical, legal and social issues, Tape lifting, Fibres, Easylift, Trace Evidence,

About the chair

Peter Vanezis qualified from Bristol University in 1972 (MB, ChB). In 1976 he was awarded the Diploma in Medical Jurisprudence (Pathology) (DMJ(Path)). In 1978 he became a member of the Royal College of Pathologists and a Fellow of the college in 1990 (FRCPath). He was awarded his doctorate in medicine (MD) from Bristol University in 1985 for research into vertebral artery trauma. In 1990 he was awarded a doctor philosophy (PhD) from London University for research into "sudden death and the menstrual cycle." In 1996 he became a member of the Royal College of Physicians and Surgeons of Glasgow proceeding to fellow in 1998 (FRCP(Glasg.)). Recently he was elected as a Founding Fellow of the Faculty of Forensic Medicine of the Royal College of Physicians in 2006 (FFFLM).

He has been a practicing forensic pathologist since 1974 and has held a number of academic and service appointments up to the current day.

His current appointments in forensic medicine include:

1. Professor in Forensic Medical Sciences at Barts and the London (Queen Mary University of London) and Director of the Cameron Centre for Forensic Medical Sciences at Barts and the London, February 2006-
2. Member of Yorkshire and Humberside Group Practice, Medico-Legal Centre Sheffield, 2006-
3. Senior Honorary Civilian Consultant in Forensic Medicine to the Armed Forces, Appointed by the Ministry of Defence July, 1992-
4. Visiting Professor of Forensic Sciences, London South Bank University, London, 2000-
5. Visiting Professor of Forensic Medicine and Science, University of Glasgow 2003-
6. Home Office Pathologist, 1990-1993 and 2003-
7. Honorary Professor in Forensic Medicine at the University of Hong Kong 2003-

He became an Officer of the Order of the British Empire awarded in the Queen's Birthday Honours List June 2001, for Forensic Pathology Services in Kosovo.

He is a member of a number of examining boards in forensic medicine and has served from time to time on college and medical school committees

About the Speakers

Tim Thompson is a Reader in Biological & Forensic Anthropology at Teesside University, and acts as a consultant in this, mainly in north-east England. Before this he did his PhD in the Faculty of Medicine at the University of Sheffield, and worked for three years as a Lecturer in Forensic Anthropology at the University of Dundee. He was also a Senior Lecturer in Crime Scene Science at Teesside for four years. He is a Fellow of the Forensic Science Society, on the Council for the British Association for Biological Anthropology and Osteoarchaeology, and the editorial board for the Journal of Forensic Sciences.

Victor Toom, a sociologist of science and law, empirically scrutinizes the uses of new and emerging forensic DNA typing technologies in contexts of law enforcement and mass human fatality investigation. Victor is research associate at the Northumbria University Centre for Forensic Science in Newcastle upon Tyne, and is a Leverhulme Trust Early Career Research Fellow. His work blends extensive knowledge of forensic genetic technologies with state-of-the-art social scientific methodologies and theories. His publications have appeared in social scientific journals, legal journals, forensic science journals and newspapers as well as in edited volumes. He is the author of a book (Kluwer, 2011) on twenty years forensic DNA profiling in the Netherlands.

Claire Gwinnett is a senior lecturer and researcher in forensic science; specifically trace evidence, at Staffordshire University. Her areas of expertise include hair, fibres and glass evidence, proficiency testing and forensic database production, particularly trace evidence but also other evidence types, for example, she is currently working on a collaborative project with Sheffield Teaching Hospitals with the Forensic Podiatry Unit in the development of a bare footprint database. Dr Gwinnett has advised in the development of a new system for competency testing with the Forensic Science Society and is currently working with Staffordshire Police and The Netherlands Forensic Institute in the testing of a new method, developed and patented at Staffordshire University, which will enhance forensic fibres work. Dr Gwinnett has also been a consultant and developer for the generation of forensic science education and training for the University of Mauritius and is currently the external examiner for the forensic science programme at the University of Technology in Jamaica.

Event Web site: www.regonline.co.uk/crime2013

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- ▯ There may be an independent meeting report published within a few months of this event. If this is published we will send you an email to let you know the reference details
- ▯ Notepads and pens are available from the Euroscicon reception desk
- ▯ We cannot give out the slides from our speaker's presentations as they are deleted immediately after each event. If you require a particular set of slides please approach the speaker
- ▯ Please remember that EuroSciCon is a small independent company with no subsidies from society memberships or academic rates for venues. We try to be as reasonably priced as possible and our delegate rates are substantially lower than comparable commercial meeting organisations
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- ▯ We may take pictures during the meeting. These pictures will be used to promote our events and placed on our various websites and the closed Euroscicon group on Facebook. If you do not want your photograph distributed please let one of the Euroscicon staff know.

POSTERS

MISSING PERSONS AND NAMELESS CADAVERS: THE ITALIAN GOVERNMENTAL SOLUTION AND THE ROLE OF FORENSIC ODONTOLOGISTS

E. Nuzzolese, P. Ricci

*University of Magna Graecia, Catanzaro, Italy
Centro Odontoiatrico Medicolegale
Viale JF Kennedy, 77 - 70124 Bari, Italy
emilionu@tin.it*

This abstract is submitted for oral presentation at the Crime scene analysis and victim identification forum on Monday the 11th of March 2013.

In Italy, since 1st April 2010 in the 'Sistema Ricerca Scomparsi – Ri.Sc.' (*Missing Persons Search System*) database concerning missing persons and unidentified cadavers, forensic odontologists have been able to have an active role, together with the medical examiners, regarding the compilation of the 'Ri.Sc.' form in order to collate pertinent dental data and oral radiographs of the cadaver with the aim of leading towards a positive identification. The Italian data is disconcerting: approximately 25 thousand people have disappeared since 1974, with an annual growth of 800-1000 people. Out of these, 1651 are Italian children and as many as 8153 are foreign children. To date, 832 bodies have been found and still await identification.

In order to test the functionality of the record system itself, the system was used on a sample of three unidentified cadavers (one decomposed, one skeletonised, one carbonised). The study revealed that the recording system allows for an immediate and simple method of data collection for the creation of a general biological profile whilst at the same time, allowing for amplification of the odontological profile.

The forensic odontologist is of fundamental importance, not only in the analysis of the restorations in situ in the oral cavity but also for maxillary and dental radiography, geographical origin, personal habits and an estimated dental age. Digital radiographs are easily archived and may be forwarded and used as an internal instrument of comparison for the Ri.Sc. system.

The authors underline the importance of the dentist also being an expert in forensics so that all pertinent information may be retrieved and rendered useful for identification purposes and thus archived as a complete profile of the unidentified cadaver. This importance should also be underlined during the collection and coding of AM dental data during investigative procedures carried out by investigative police that – in Italy – do not have odontologists as part of their team of specialists who are routinely commissioned to deal with this type of data collection. The authors propose a simple checklist to facilitate both the investigative police and the relatives of the missing person for the collection of all dental data.

In order to maximize the efficacy of the identification process of human remains, it is necessary to perform a complete post-mortem dental examination. The failure to routinely employ odontologists in missing persons investigations may result in a reduction of additional findings which, together with other circumstantial evidence, could lead to a delay in positive identification. Odontologists could also record information revealed during the PM on an appropriate international form, such as those suggested by Interpol, should the nationality of the cadaver be uncertain. Interpol forms are, in fact, an excellent way of fostering the mutual exchange of information which may lead towards the positive identification of unidentified human remains.

A DERMATOGLYPHIC ANALYSIS OF THE MINUTIAE OF THE SLOVAK POPULATION FOR FORENSIC PURPOSES

D. Kramárová, K. Kyselíková, R. Beňuš, S. Masnicová, Z. Némethová, M. Španková

Comenius University in Bratislava, Faculty of Natural Sciences, Department of Anthropology, Mlynská dolina B2, 842 15 Bratislava, Slovakia, kyselikova@fns.uniba.sk, lattakova@yahoo.com

Fingerprints are the most widely used biometric features for person identification. The uniqueness and irregularities in their structure are considered to be legitimate proof of evidence in courts of law all over the world. For criminal investigation special attention is given to the structure of dermatoglyphic minutiae, the minor irregularities in the course of the ridge. In our study, thirteen types of minutiae on the distal phalanges of both hands were evaluated: ridge ending, fork, fragment, dot, break, enclosure, overlap, bridge, opposed bifurcation, triple fork, dock and return. This paper presents the approach to define the minutiae types most advisable to be monitored in personal identification systems on the basis of their co-occurrence and correlation of minutiae pairs. The analyses of the frequency of dermatoglyphic patterns was done as well. The studied 1020 fingerprints came from a group of 102 individuals all of them male and from the territory of the Slovak republic. The dactyloscopic material was afforded by the Department of Dactyloscopic Identification at the Institute for Criminalistics and Expertise of the Police assembly in Bratislava, Slovakia. The fingerprints came from 14 to 51 year old individuals, the average age of the whole group was 21.77 years. The average number of minutiae observed on one finger was 89.15, while on the right hand more minutiae were observed than on the left hand. The minutiae types with the highest incidence were fork (43.02%) and ridge ending (35.94%) and the lowest incidence was observed for the opposite bifurcation (0.17%), dock (0.13%) and triple fork (0.07%). The minutia types opposite bifurcation, dock and triple fork should be therefore the most suitable for individual identification. There was a significant bilateral difference in the frequency of the minutiae types fork, dot, break and triple fork. The uncorrelated minutiae pairs are: dot-enclosure, dot-bridge, dot-opposed bifurcations, dot-dock, break-dock, enclosure-crossbar, enclosure-triple fork, crossbar-opposed bifurcations, crossbar-triple fork, bridge-triple fork, opposed bifurcations-triple fork and opposed bifurcations-dock. These mentioned couples are the most suitable for personal identification. This contribution is the result of the project implementation: Center of excellence for security research, ITMS code: 26240120034, supported by the Research and development Operational Programme funded by the ERDF.

HEAT GENERATION IN MAGGOT MASSES AND ITS EFFECT ON LARVAL DEVELOPMENT

V Heaton MSc; C Moffatt PhD; T Simmons PhD

School of Forensic and Investigative Sciences, University of Central Lancashire, Preston, PR1 2HE

Temperatures recorded at death scenes, combined with known larval development rates from temperature controlled laboratory experiments, allow the estimation of maggot age and time of death. However, very few studies take into consideration the mass generated heat produced by larvae co-existing in an aggregation. This study investigates the relationship between the number of blow fly larvae in a mass and the amount of heat generated, as well as highlighting the potential impact this microclimate has on larval development rates, and hence, any subsequent PMI estimates.

Various sized larval masses (50-2500 larvae) composed solely of *Lucilia sericata* were reared in the laboratory at a constant ambient temperature of 22°C. Data loggers and a thermal imaging camera were used to record mass temperatures at five minute intervals throughout feeding. Developmental rates were determined by sampling larvae at hourly intervals and identifying them as either first, second or third larval instar. Data collection ceased once larvae entered the post-feeding phase of development and migrated away from the mass. The results showed a strong positive relationship between mass size and the amount of heat generated by the aggregation (p -value<0.005), with temperatures rising as masses increased in size. A minimum mass size of 1200 individuals was required for the local temperature to increase significantly above ambient with aggregations of 2500 larvae producing temperatures exceeding ambient by up to 14°C. Larvae developing in larger, and hence hotter, masses were observed to reach the post-feeding stage of development 13 hours earlier than larvae in smaller, cooler masses. This accelerated development was most pronounced during the second and third larval instars when masses were at their warmest. Large masses containing 2500 larvae were observed to progress through second instar in as little as 10 hours compared to smaller masses which required 17 hours. Similar differences were noted in the third (feeding) instar.

These increasing rates of development caused by localized amplifications in temperature could have serious implications for the field of forensic entomology. If the high temperatures produced by larval masses are creating a microclimate which favours faster development, then larvae will appear larger, and hence older, sooner than expected. Problems may then arise when these larvae are compared to laboratory reared larvae and aged without taking into account the mass size or the heat that was generated. This could lead to an overestimation of the minimum PMI.

Contact details for Vivienne Heaton – email: vheaton@uclan.ac.uk