



INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

INITIATIVE ON FORENSIC GEOLOGY (IFG)

ANNUAL REPORT FOR 2018

DR LAURANCE DONNELLY, CHAIR IUGS-IFG

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**INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)
INITIATIVE ON FORENSIC GEOLOGY (IFG)**

Annual Report 2018

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**INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)
INITIATIVE ON FORENSIC GEOLOGY (IFG)
ANNUAL REPORT FOR 2018**

1 TITLE OF CONSTITUENT BODY

The International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG) was launched at the 62nd Executive Committee meeting of the IUGS, at UNESCO headquarters, in Paris, France, on 22 February 2011.

1.1 Report Objective

This document is the IUGS-IFG Chair's Annual Report for 2018. It has been produced for the IUGS Executive Committee and it gives summary of the IFG events, activities and progress throughout 2018. A financial summary of the IFG accounts is also included and a forecasted and estimated budget for 2019.

2 AIM

2.1 Mission Statement

The aim of IUGS-IFG is to develop forensic geology internationally and promote its applications.

2.2 IUGS-IFG Objectives

The objectives of the IUGS-IFG are to:

1. Collate and disseminate data and information on forensic geology applied to policing and law enforcement, criminal, environmental and civil investigations;
2. Promote international meetings, seminars, conferences and training;
3. Develop a 'Committee' to act as principal advisers, collaborators and active participants;
4. Develop an international network whereby each 'member' will act as a principal contact in their respective country for the collation and dissemination of information on forensic geology;
5. Collate, make available and where appropriate review any existing documentation and publications in forensic geology; and
6. Produce a document endorsed by the IUGS Committee to be called; '*A Guide to Forensic Geology*'.

3 ROLE WITHIN IUGS SCIENCE POLICY

3.1 Background

The documented history of forensic geology can be traced to the latter half of the 19th Century. However, in recent years there has been renewed interests and developments in the multidisciplinary fields of forensic geology throughout the world.

Since about 2000 numerous international meetings, conferences, seminars and training on different aspects of forensic geology has taken place. Furthermore, several text books have been published and there are technical papers in peer reviewed scientific and geological journals, conference proceedings, police and law enforcement magazines.

Since 2011, IFG has formally represented the IUGS global interests in forensic geology. As such, IUGS-IFG provides training, knowledge transfer, capacity building and outreach events. These advocate the IUGS-IFG aim, '*to develop forensic geology internationally and promote its applications*'. The members of the IFG committee are senior representatives of their respected organisations and include geologists, geoscientists, police officers, forensic scientists and law enforcement agencies.

3.2 Main Approach

IUGS-IFG aims to raise the global awareness of forensic geology by holding meetings and conferences, promoting research, teaching, training and the operational deployment of forensic geologists. This will be consistent with the broad objectives of IUGS, and includes the following:

- **Knowledge transfer and capacity building:** This raises the levels of awareness and knowledge, and provides information about forensic geology;
- **Technology transfer and training:** This improvement in skill sets; and
- **Outreach:** This provides education and information to a range of stake holders that include; geologists, geoscientists, serving police officers, law enforcement organisations, the public, schools and universities, engineers, lawyers and the legal profession, forensic scientists, the media and politicians.

4 ORGANIZATION

The IUGS-IFG Committee comprises representatives from major geographical regions of the world and includes specialists from academia, industry, consultancy, operationally based forensic geologists, the police, law enforcement agencies and forensic organisations, as shown in Figure 4.1 and Table 4.1.

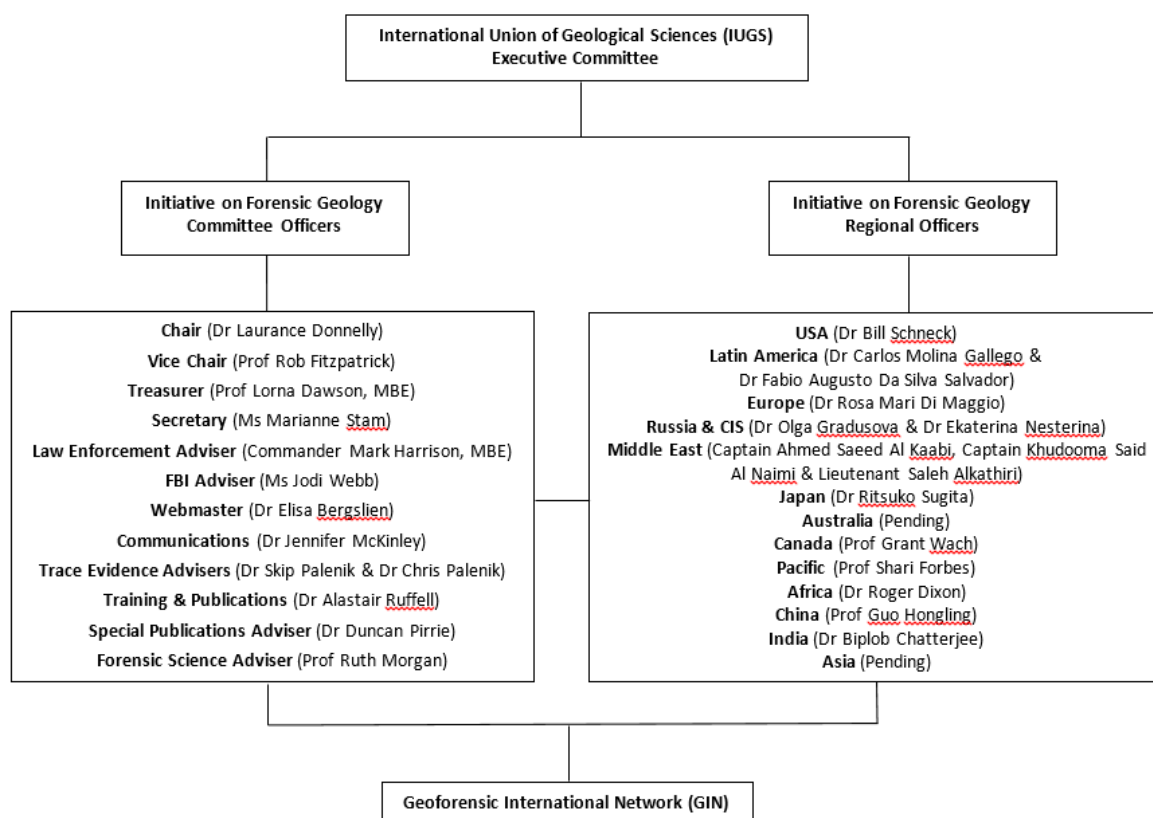


Figure 4.1. Structure of the IUGS-IFG Committee in 2018.

4.1 IFG Committee Changes and Position Changes

The IUGS-IFG committee changes in 2018 were as follows:

- The position of ‘Honorary Committee Member’ of IUGS-IFG no longer exists following the death of Dr Raymond Murray.
- Dr Biplob Chatterjee was appointed to the IUGS-IFG Committee as the Officer for India.

POSITION	NAME	COUNTRY	AFFILIATION
Chair	Dr Laurance Donnelly ¹	England	IUGS-IFG, Lancashire, England, UK
Vice Chair	Prof Rob Fitzpatrick ²	Australia	CSIRO, Australia
Treasurer	Prof Lorna Dawson CBE ³	Scotland	The James Hutton Institute, Aberdeen, Scotland, UK
Secretary	Ms Marianne Stam ⁴	USA	California Department of Justice, Los Angeles, USA
Webmaster/Information Officer	Dr Elisa Bergslien ⁵	USA	SUNY Buffalo State, New York, USA
Geoforensic Law Enforcement Adviser	Commander Mark Harrison MBE ⁶	Australia	Australia Federal Police, Australia
FBI Adviser	Ms Jodi Webb ⁷	USA	Federal Bureau of Investigation (FBI), Virginia, USA
Training and Publications	Dr Alastair Ruffell ⁸	Northern Ireland	Queens University Belfast, Northern Ireland
Communications	Dr Jennifer McKinley ⁹	Northern Ireland	Queens University, Belfast, Northern Ireland
Special Publications Adviser	Dr Duncan Pirrie ¹⁰	England	Helford Geoscience LLP, Cornwall, UK
Forensic Science Adviser	Prof Ruth Morgan ¹¹	England	University College London, JDI Centre for the Forensic Sciences, London, UK
Geological (Trace) Evidence Advisers	Dr Skip Palenik ¹² Dr Chris Palenik ¹³	USA	Microtrace LLC, Illinois, USA
Officer, USA	Dr Bill Schneck ¹⁴	USA	Microvision Northwest Forensic Consulting Inc (formerly Washington State Patrol Crime Lab
Officer, Latin America	Dr Carlos Molina Gallego ¹⁵ Dr Fábio Augusto Da Silva Salvador ¹⁶	Colombia Brazil	The Universidad Antonio Nariño, Instituto Nacional de Medicina Legal y Ciencias Forense, Bogota, Colombia Perito Criminal Federal, Chefe do Setor Técnico-Científico, Superintendência da Polícia Federal no Paraná Brazilian Federal Police, Curitiba, Brazil
Officer, Europe	Dr Rosa Maria Di Maggio ¹⁷	Italy	Geoscienze Forensi Italia (Formerly Servizio Polizia Scientifica), Rome, Italy
Officer, Russia & CIS	Dr Olga Gradusva ¹⁸ Dr Ekaterina Nesterina ¹⁹	Russia	Russian Federal Centre of Forensic Science and Soil Trace Evidence Experts, Moscow, Russia
Officer, Middle East	Captain Ahmed Saeed Al Kaabi ²⁰ Captain Khudooma Said Al Naimi ²¹ Lieutenant Saleh Ali Al Katheeri ²²	UAE	Abu Dhabi Police, Forensic Evidence, United Arab Emirates
Officer, Japan	Dr Ritsuko Sugita ²³	Japan	National Research Institute of Police Science, Japan
Officer, Pacific & Australia	Prof Shari Forbes ²⁴	Australia	University of Ontario Institute of Technology (UOIT)
Officer, Canada	Prof Grant Wach ²⁵	Canada	Basin and Reservoir Lab, Dalhousie University, Halifax, Nova Scotia, Canada
Officer, Africa	Dr Roger Dixon ²⁶	South Africa	University of Pretoria (Formerly, Forensic Science Laboratory, South African Police Service), South Africa
Officer, China	Dr Guo Hongling ²⁷	China	Institute of Forensic Science, Ministry of Public Security, Division of Trace Evidence Analysis, China
Officer, India	Dr Biplob Chatterjee ²⁸	India	Geovale Services, West Bengal, India
Crime Scene Adviser (Pending)	Prof Pier Matteo Barone ^{Pending}	Italy	The American University of Rome

Table 4.1. IUGS-IFG committee in 2018.

5 NATIONAL, REGIONAL & GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

IUGS-IFG has estimated that the Committee Officers and/or their organisations provided at least **304 person days** during 2018. This has incurred by attendance at conferences, training courses, knowledge transfer events, provision of outreach events and the management of the Initiative, and the writing of publications. The value of this in-kind support is difficult to quantify, however a commercial value to the time spent on the IUGS-IFG (based on an average and estimated cost rate of \$100/per hour) would possibly be in excess of approximately **USD (\$) 243,000**. In addition, participation in the various IUGS-IFG events during the year has also been supported directly by committee members employers and via research funding of an estimated value of approximately **USD (\$) 28,000**.

6 ACKNOWLEDGEMENTS

Throughout 2018, IUGS-IFG received support and collaboration from numerous individuals and organisations, which IUGS-IFG greatly acknowledges and this include the following:

- **IUGS Executive Committee.**
- **Commercial companies:** Alfred Knight International; Helford Geoscience LLP (UK); Microtrace LLC; James Hutton Limited; Geoscienze Forensi Italia; Geoforensic and Specialist Search International; Geovale Services, West Bengal, India and Kawasaki Geological Engineering Co., Ltd., Japan.
- **Police Forces, Law Enforcement, Federal Agencies and Government Organisations:** California Department of Justice; Australian Federal Police; Australian Criminal Intelligence Commission; Brazil National Police Academy (Marcelo Blum, Erich Adams and Fábio Augusto da Silva Salvador); Washington State Patrol Crime Lab; Abu Dhabi Police; Russian Federal Centre of Forensic Science of the Ministry of Justice of Russia; National Research Institute of Police Science of Japan; Brazilian Federal Police, National Crime Agency (NCA); Police National Search Centre (PNSC); Home Office Centre for Applied and Scientific Research (CAST); Defence Science and Technology Laboratory (Dstl); Crime and Policing Sandridge, Counter Terrorism and Security Division (Nicola West and Michael Ferguson); Ministry of Defence, Defence College of Policing and Guarding; Police Scotland; Federal Police of Argentina; Italian House of Representatives and Federal Bureau of Investigation (FBI) Laboratory, Quantico Washington DC (Jodi Webb, Maureen Bottrell, Libby Stern, Ian Saginor, Gene Peters, Craig Schultz, Wynn Warren)
- **Universities, Research Institutes and Professional Societies:** Geological Society of America (GSA); Geological Society of London, Forensic Geosciences Group (FGG) and Near Surface Geophysics Group (NSGG); Geological Society of Japan; Ingeominas (Geological Survey of Colombia); The American University of Rome (Prof Pier Matteo Barone); Institute of Forensic Science in China; University of Pretoria; University College London JDI Centre for the Forensic Sciences; University of Ontario Institute of Technology; University of Canberra; Dalhousie University; University of Huddersfield (Dr Anna Williams); CSIRO Australia; Centre for Australian Forensic Soil Science (CAFSS); Buffalo State College; Queens University Belfast; the James Hutton Institute; University of Technology Sydney; University of Keele, Department of Earth Sciences; University of Pretoria; University of Wales; Nacional Institute of Criminalistics in Brazil; Universidad Antonio Narino, Bogota, Colombia; Australian Facility for Taphonomic Experimental Research (AFTER); European Network of Forensic Science Institutes (ENFSI) Animal, Plant and Soil Traces (ASPT); Forensic Canine Detection, Staffordshire University Department of Criminal Justice and Forensic Science, School of Law, Policing and Forensics; International Geoscience Education Organization, Brazil; Brazilian Geological Congress; International Association for Promoting Geodetics (IAPG); National Police Academy of Brazil; University of Amsterdam Taphonomy Faculty; House of Lords Science and Technology Committee; European Meeting on Forensic Archaeology (EMFA); Forensic Anthropology Research Facility (FARF); University of Texas, Soil Science Australia, Australian Clay Society and the National Association of Families and Friends of Missing People, Red Cross Central Laboratory in Rome, Italy, Universidad Autonoma de Mexico (UNAM) and the Annual Meeting of Mexican Geophysics.

7 INTERACTION WITH OTHER INTERNATIONAL PROJECTS & ORGANISATIONS

Throughout 2018, IUGS-IFG interacted and collaborated with the organisations and projects that included those listed in Table 7.1. This excludes operational support for Police and Law Enforcement casework, which is confidential.

ORGANISATION	TYPE OF INTERACTION	PROJECT/EVENT
January		
3rd Ibero-American Seminar on Forensic Geoscience and Federal Police of Argentina, La Plata, Argentina (actual event in December 2017, publication of abstracts in 2018)	Knowledge exchange and capacity building	Co-organisers and workshop lead
CAST, Search Technologies Academic Research Team (START), UK	Knowledge exchange, capacity building, training and publications	Members of START
Presentation to UK Engineers and Scientists, Manchester	Outreach	Invited speaker
IUGS, 72 nd Executive Committee Meetings, Potsdam, UK	Committee Meeting	Invited guest and speaker
February		
Police Scotland	Training	Organisers
Italian House of Representatives, Rome, Italy	Political event	Invited speaker
National Association of Families and Friends of Missing People and Red Cross Central Laboratory	Knowledge exchange and capacity building	Invited speaker
ENFSI, Animal, Plant and Soil Traces (ASPT)	Conference and working group	Participant and co-organiser
March		
Brazilian Federal Police	Training	Organisers
Forensic Canine Detection	Knowledge exchange and capacity building	Invited guest
Forensic Geology in Italy	Conference, knowledge exchange and capacity building	Co-organisers and workshop lead
April		
Brazilian Federal Police, International Geoscience Education Organization (IGEO) and the Brazilian Geological Congress.	Conference, knowledge exchange and capacity building	Co-organisers and workshop lead
May		

Geovale Services, West Bengal, India	Strategic	Development of forensic geology in India and planning for IGC 2020
June		
International Association for Promoting Geoethics (IAPG)	Conference	Co-organiser of session on forensic geology and geoethics
Planning for the 4th IberoAmerican Congress on Forensic Geology, Universidad Autonoma de Mexico (UNAM) and the Annual Meeting of Mexican Geophysics, Mexico	Conference, knowledge exchange, capacity building and training	Co-organisers and workshop lead
ENFSI, Animal Plant Soil Trace Group (APST)	Conference	Speaker
University of Amsterdam Taphonomy Faculty	Collaboration	Invited guest
Forensic Geology in Japan, Kawasaki Geological Engineering Co., Ltd	Conference	Invited speaker
July		
House of Lords, Inquiry on Forensic Science	Political	Invited participant
Geovale Services, West Bengal, India	Strategic	Development of forensic geology in India
August		
Dstl, Search Technologies Academic Research Team (START)	Knowledge exchange, capacity building, training and publications	Members of START
Conflict Minerals, Substitution, Adulteration and Fraud, Mexico	Confidential	Investigation
7th EMFA, Queens University Belfast, Northern Ireland	Conference	Co-organisers and workshop lead
September		
Locating Homicide Graves and Mass Graves in Colombia	Confidential	Investigation
Forensic Geology in Japan and the Geological Society of Japan	Publication	Co-editor and contributor
October		
Police Search for a Grave in Canada	Confidential	Investigation
MSc Course at Cardiff University, Wales	Teaching	Course contributor
The Colombian Gold Fingerprinting Project, University of Pretoria, Colombian Geological Survey (Ingeominas), Colombian Ministry of Mines	Confidential	Investigation
November		
Forensic Geology and Forensic Taphonomy, University of Central Lancashire, UK	Conference	Delegate

Forensic Anthropology Research Facility (FARF), University of Texas, USA	Research	Potential collaboration
Soil Science Australia, Australian Clay Society, National Soils Conference	Conference	Co-organisers
House of Lords, Science and Technology Committee, Inquiry on Forensic Science	Political	Invited participant
IUGS-IFG First Forensic Geology Meeting in India; Ministry of Home Affairs; IGS Organising Committee, Geological Survey of India; Geovale Ltd; Amity University & Aspire Forensics; Central Forensic Laboratories; National Institute of Criminology and Forensic Science; Secretary General of India's 36 th IGC 2020 organising committee	36 th IGC, Delhi, 2020 and training	Organisers of session on forensic geology
Biohazard from a Cemetery	Confidential	Advisory
Forensic Canine and Search Papers	Publication	Contributory
Defence College of Policing and Guarding	Confidential	Confidential
Organisation of Scientific Areas Committee (OSAC), USA	Knowledge exchange, capacity building	Invited participant
December		
Brazilian Federal Police	Training	Co-organisers
From Crime Scene to Courtroom, AGU, Washington DC, USA	Conference	Delegate and co-organisers of session on forensic geology
IUGS-IFG Meeting with Geological Society Director of Science & Communications	Strategic	Meeting organiser
Archaeological Geophysics, Environmental & Criminal Forensics, Geological Society of London. Near Surface Geophysics Group (NSGG) and Forensic Geoscience Group (FGG)	Conference	Co-organisers
Forensic Geoscience Group (FGG), General Committee Meeting	Strategic	Invited
IUGS Initiative on Forensic Geology, Sub-Committee Meeting	Strategic	Meeting organiser
Federal Bureau of Investigation (FBI), Washington DC, USA	Confidential	Confidential

Table 7.1. Selected examples of IUGS-IFG collaboration with other projects and organisations during 2018.

8 MAIN CHIEF ACCOMPLISHMENTS

8.1 JANUARY

8.1.1 3rd Ibero-American Seminar on Forensic Geoscience, Argentina^{3,9,14,15,16,17,24}

This event was held in December 2017 and the booklet of abstracts finalised in January 2018 (<http://www.conicet.gov.ar/wp-content/uploads/Booklet-Argentina-Seminar.pdf>). This focused on the development of forensic geology throughout Latin America, following previous events held in Colombia (2009), Mexico (2010), Brazil (2013, 2015, 2016, 2017, 2018) and Uruguay (2010). These include an IUGS-IFG multi-disciplinary forensic geology team working in collaboration with Federal Police, national institutions, universities and local experts. A combination of knowledge exchange, capacity building and formal training was provided in; geological trace evidence, crime scene examination and ground searches for burials. These are related to serious crimes such as; criminal, humanitarian and environmental incidents, the search for missing persons and unknown graves. These were associated with organized crime, mass burials, torture and homicide, environmental crimes such as deforestation and pollution, drug trafficking, violation of human right, terrorism, smuggling, fraud, embezzlement, robbery, sexual crimes, precious mineral, fossil and metal theft and fakes.

8.1.2 CAST, Search Technologies Academic Research Team (START)^{1,3,8,9,10,11}

Members of IUGS-IFG were invited to attend the second meeting of START. This was established as part of the UK Governments remit to reduce crime and deliver justice with emphasis on the search for missing persons. At least 300,000 people a year in the UK alone are reported as missing. This wprlom group focussed on the potential for the development of new research facility. A presentation was delivered by IUGS-IFG, giving an overview of the Geoforensic Search Strategy, developed over a period of approximately 25 years to locate burial associated with shallow, unmarked, homicide graves.

8.1.3 Presentation to UK Engineers and Scientists, Manchester, UK¹

On 1 February 2018, an outreach presentation on forensic geology was given in Manchester, UK. This included geological trace evidence, crime scene examination, search, environmental and geotechnical forensics and operational casework examples. The audience comprised approximately 40 geologists, civil engineers, geotechnical engineers and environmental scientists.

8.1.4 IUGS 72nd Executive Committee Meeting, Potsdam, Germany¹

IUGS-IFG Chair, Dr Laurance Donnelly, attended the 72nd IUGS Executive Committee Meeting, at Potsdam, Germany, to provide an overview of IUGS-IFG events, activities and main achievement in 2017. An meeting was also held with Dr Silvia Peppoloni (IAPG Secretary General) to plan for a joint IFG and IAPG event at RFG2018, in Vancouver, to discuss Geoethics in Forensic Geology and to produce a draft Code of Conduct for forensic geologists.

8.2 FEBRUARY

8.2.1 Police Scotland³

On 7-8 February 2018, soil sampling and recovery awareness raising days were held with the Scottish Police Service at the Police Training College, Tulliallan, Scotland.

8.2.2 IUGS-IFG and the Italian House of Representatives, Rome, Italy¹⁷

On 22 February 2018, IUGS-IFG Officer for Europe, Dr Rosa Maria Di Maggio, was invited by the Italian House of Representatives (the Italian Parliament) to deliver a presentation on forensic geology on *'The Missing: Social, Technical and Juridicial Issues'*. The conference was organised by Italian political parties to highlight the Italian state-of-art at planning, implementing and managing the search for missing persons. This considered different approaches including a review of investigative data and information and the analysis of digital intelligence, social and psychological behavioural profiles and search. The objectives of the presentation were to: (a) highlight the recent developments and

important contribution of forensic geology in searching missing persons, (b) illustrate the environmental, geographical, geological and geomorphological features that can influence the deposition site (grave) of a missing person, (c) illustrate the geological techniques that are now available and have been applied to search missing persons. This includes for example the use of geophysics (e.g. GPR and EM metal detectors) in association with other techniques (e.g. air observations, detector dogs units, the use of a drone, etc.) (d) provide an overview of the work conducted by IUGS-IFG, including its establishments, aim, objectives, countries represented and advances in search. This presentation also drew attention to the IUGS-IFG activities including outreach, capacity building and knowledge transfer and training. Links to the IUGS-IFG and other publications were provided (e.g. Episodes, 2017, Themed Issue on Forensic Geology). The conference was attended by more than 120 delegates that included members of law enforcement, representatives from the media and political parties, journalists, members of voluntary associations in support of relatives of missing persons and the Red Cross.

8.2.3 National Association of Families and Friends of Missing People and the Red Cross¹⁷

IUGS-IFG Officer for Europe, Dr Rosa Maria Di Maggio, was invited by the representatives of National Association of Families and Friends of Missing People (Associazione Nazionale delle Famiglie e degli Amici delle Persone Scomparse) to take part in a technical debate and provide suggestions for improving the laws and protocols related to the search for missing persons. Dr Di Maggio was also invited by the representatives of Red Cross to give a presentation at Red Cross Central Laboratory, in Rome. The objective of this presentation was to provide an overview of the applications of forensic geology in the search for missing persons associated with crime and natural disasters such as earthquakes, landslides and floods.

8.2.4 ENFSI, Animal, Plant and Soil Traces (ASPT)³

On 20-22 February 2018, IUGS-IFG Treasurer, Prof Lorna Dawson, hosted a group at the James Hutton Institute from the European Network of Forensic Science Institutes (ENFSI) to discuss a soil handling best practice manual for European accredited forensic laboratories. This is a two-year project funded by the European Union.

8.3 MARCH

8.3.1 Forensic Canine Detection^{1,8,9}

On 7 March 2018, IUGS-IFG members took part in a forensic canine detection event at Staffordshire University, UK. Further research was proposed to better understand the geological influences on the deployment of victim recovery dogs during ground searches for homicide graves.

8.3.2 Forensic Geology in Italy¹⁷

On 4, 11 and 25 March 2018 a series of knowledge exchange and capacity building events were held throughout Italy, supported and endorsed by IUGS-IFG. This included crime scene examination, and ground searches for burials.

8.4 APRIL

8.4.1 Brazilian Federal Police and Forensic Geology¹⁶

IUGS-IFG Officer for Latin America, Dr Fábio Augusto da Silva Salvador, delivered presentations on forensic geology at the Quadrennial Conference of the International Geoscience Education Organization (IGEO) (<https://www.ige.unicamp.br/geoscienced2018/en/>) and the Brazilian Geological Congress (<https://www.49cbg.com.br/>). The federal police promoted the training and the applications of forensic geology and trafficking for federal criminal experts. For the first time this was included in the official schedule of the National Police Academy. The organisers and instructors were Marcelo Blum, Erich Adams and Fábio Augusto da Silva Salvador. The status of Forensic Geology in Brazil was

presented at RFG2018, Vancouver, June 2018. This included new projects with the Brazilian Federal Police and universities.

8.4.2 Dr Raymond C Murray, Forensic Geologist

Dr Raymond C Murray, Forensic Geologist, died on 7th April 2018, aged 88.

8.5 MAY

8.5.1 IUGS-IFG Committee in India^{1,28}

IUGS-IFG assigned Dr Biplob Chatterjee (Geovale Services, West Bengal, India) to the IUGS-IFG Committee as the Officer for India. Dr Chatterjee will become involved in the promotion of forensic geology in India and facilitate the proposed forensic geology session, at the 36th IGC, Delhi, 2020. This completes an almost five year 'search' for a suitably qualified and experienced geologist to represent IUGS-IFG's interest for the initiation and development of forensic geology in India.

8.6 JUNE

8.6.1 Forensic Geology and Geoethics, Vancouver, Canada^{1,3,8,16,17}

At RFG2018, in Vancouver, IUGS-IFG jointly organised with the International Association for Promoting geoethics (IAPG) a session entitled, '*Forensic Geology; Ethics, Communication, Regulation and Opportunities (RS12)*.' The scope included; ethical issues of geoscience data, expert opinion communication, sampling strategies, geostatistics, ground search, databases, accreditation and regulation, alignment with forensic science, illegal trade in geological commodities, international wildlife crime, legal issues, interpretation and communication, managing casework, security, dealing with fatalities, use of GIS, application of stable isotopes in provenancing and casework. As a result, a white paper on Geoethics and Forensic Geology will be co-authored by IUGS-IFG & IAPG.

8.6.2 4th IberoAmerican Congress on Forensic Geology, Mexico^{1,15,16}

IUGS-IFG agreed to co-organise the 4th IberoAmerican Congress on Forensic Geology, at Puerto Vallarta, Jalisco, Mexico, 28 October to 2 November 2019, in collaboration with the Universidad Autonoma de Mexico (UNAM) and the Annual Meeting of Mexican Geophysics.

8.6.3 ENFSI, Animal Plant and Soil Trace Group (APST), France³

IUGS-IFG was represented at an EBFSI, APST meeting in Pontoise, France, to produce a best practice manual for collection and analysis of soil in Europe.

8.6.4 University of Amsterdam Taphonomy Faculty, Netherlands^{1,3,8,9,10,11}

IUGS-IFG was represented at the University of Amsterdam Taphonomy Faculty, in the Netherlands. The aim of the visit was to discuss methods for the analysis of soil and diatoms in trace evidence and the interpretation of soil trace evidence. A follow on meeting was proposed in January 2019 to also discuss experimental research to assist ground searches for burials.

8.6.5 Forensic Geology in Japan, Kawasaki Geological Engineering Co., Ltd.²

On 28 June 2018, IUGS-IFG Officer for Japan, Dr Ritsuko Sugita, delivered an invited lecture on Forensic Geology at an annual workshop of Kawasaki Geological Engineering Co., Ltd. This is one of the largest geological consulting companies in Japan that uses geophysics and conducts pollen analysis.

8.7 JULY

8.7.1 House of Lords, Inquiry on Forensic Science^{1,3,8,9,10,11}

The House of Lords, Science and Technology Committee conducted an inquiry into forensic science. IUGS-IFG responded to a request to submit evidence to this inquiry. This provides an opportunity for IUGS, IFG and forensic geology to be brought to the attention of the House of Lords. It is anticipated

the results of the inquiry will address many aspects of the broader field of forensic science. The hearing will be held in autumn 2018 and recommendations are expected in spring 2019.

8.7.2 Forensic Geology in India^{1,28}

IUGS-IFG established a framework and developed a strategy to initiate forensic geology in India, which included engagement with the police, political and forensic organisations.

8.8 AUGUST

8.8.1 Dstl, Search Technologies Academic Research Team (START)^{1,3,8,9,10,11}

In May 2018, the Centre for Applied Science and Technology (CAST) became officially integrated into the Defence Science and Technology Laboratory (Dstl) as part of the Ministry of Defence (MOD). As such, Dstl became the primary delivery organisation for the provision of science and technology required by the Home Office. START therefore transferred to Dstl. The third START meeting was held at Staffordshire University, Department of Criminal Justice and Forensic Science, School of Law, Policing and Forensics. Several members of IUGS-IFG were present and took part in discussion that debated the benefits of a UK research facility and ground search techniques for burials.

8.8.2 Conflict Minerals, Substitution, Adulteration and Fraud, Mexico¹

IUGS-IFG was represented in Manzanillo and Guyamas, Mexico, to investigate geological methods and techniques to manage and mitigate risks associated with fraud and theft in the minerals and mining industry.

8.8.3 7th EMFA, Queens University Belfast, Northern Ireland^{8,9}

On 23-24 August 2018, IUGS-IFG Training Officer, Dr Alastair Ruffell, and Communications Office, Dr Jennifer McKinley, hosted at Queens University Belfast, Northern Ireland, the 7th European Meeting on Forensic Archaeology.

8.9 SEPTEMBER

8.9.1 Locating Homicide Graves and Mass Graves in Colombia^{1,8,15,16}

Since 2009 members of IUGS-IFG have been involved in the search for graves in Colombia related to homicide and serious organised crime. A documentary was produced that features IUGS-IFG Officer for South America, Dr Carlos Molina. This includes the use of geological mapping, satellite imagery, photogrammetry and geophysics to the in the search for graves. Further details can be found at; <https://www.dw.com/en/truth-detectives-2/av-44554549>

8.9.2 Forensic Geology in Japan, the Geological Society of Japan²³

The Geological Society of Japan has agreed to produce a special issue publication on forensic geology. This will be freely available in electronic format in both Japanese and English. The publication is expected to progress in 2019 including submissions from IUGS-IFG.

8.10 OCTOBER

8.10.1 Police Search for a Grave in Canada^{1,8,25}

IUGS-IFG provided operational support to assist the police who received information that human remains were buried at a particular location. This included the provision of a search strategy, an evaluation of the geology, the development of a Conceptual Geological Model and an assessment of target detectability and diggability. Advice was provided on the most suitable search assets and deployment methodology.

8.10.2 MSc Course at Cardiff University, Wales^{1,10}

IUGS-IFG provided an outline scope and objectives for a new MSc course at Cardiff University, in Wales. This included a module aimed at providing students with a thorough grounding in digital methods in geological data collection including forensic geology.

8.10.3 Forensic Anthropology Research Facility (FARF), University of Texas, USA¹

IUGS-IFG held preliminary and exploratory discussion with a view to conducting test-work to investigate leachate and volatile organic compounds (VOCs), generated from human remains to assist with ground searches. FARF covers an area of approximately 26 acres and is a human decomposition research laboratory. The facility is used by the forensic science community to gain knowledge about human decomposition and developing methods for determining the post mortem interval or time since death. FARF formally opened in 2008. Since then, research has been conducted on approximately 150 donor individuals, with another 200 living people pre-registered as donors to this unique forensic program. The potential experiments follow on from work already completed by IUGS-IFG at homicide graves sites. The observations and data are subsequently used to assist the police and geologists design open area searches for human remains, where the target is suspect to be located within a vast geographic area.

8.10.4 The Colombian Gold Fingerprinting Project²⁶

From 22-26 October 2018, IUGS-IFG Representative for Africa, Dr Roger Dixon, visited Colombia to assist with the establishment of a national gold fingerprinting program. This program, initiated by Prof Juan Carlos Molano Mendoza of the National University of Colombia, has been jointly established by the Geological Survey of Colombia, the Ministry of Mines and the University in an effort to address the problem of illegal gold mining in Colombia. Illegal gold mining in Colombia accounts for about 70% of the gold mined in that country, and is causing massive problems to the environment due to the uncontrolled use of mercury, deforestation and pollution. The government of Colombia wants to control mining to reduce these problems, and also to regulate the gold industry more effectively for the benefit of the population, not just the warlords who control large areas of the country in which the gold occurs. Dr Dixon was invited to assist and advise the Colombians due to experience in the development of the South African precious metal fingerprinting program, and the experience gained in being part of the international program to validate a fingerprinting methodology for the platinum mining industry, run by ENFSI (European Network of Forensic Science Institutions). Colombia has taken the initiative to implement a gold fingerprinting process to assist in the regulation and control of the gold industry in that country, with the plan of expanding this to include other economic minerals at a later stage. Their plan is to compile a comprehensive inventory of all the gold deposits in the country, identifying the genetic origins, associated mineralogy and mineralisation, in order to associate the elemental and isotopic fingerprints of the gold in the deposits with the geological processes. This will be extended to the different modes of beneficiation; so that the mined gold can be traced to the type of process used to extract and beneficiate it as well. A central laboratory will be established where the necessary analyses will be done, an essential part of the establishment of a legally valid database. One of the recent developments in Colombia has been the banning of the use of mercury for mining, which helps in determining whether the process used for extracting the gold is legal or illegal. Analysing for mercury is a simple way of determining the legality of mined gold, a basic but effective fingerprint of the status of the gold. As part of the regulatory framework for gold mining, all permits to mine are allocated against a specific geographic location, so the ability to determine the fingerprint of the gold is important in determining the origin of gold stated to have been mined in a specific area. A gold fingerprinting program is not an academic exercise, nor is it the simple application of regulations. It is a major program, which calls on the skills and abilities of all disciplines involved to be exercised and applied in a combined and complimentary way. It is a physical and absolute way of ensuring that the gold that is legally mined is legal, and it is a way to regulate the trade in illegal gold and in so doing limiting the extent of the illegal gold mining industry. It will also result in a better understanding of

the country's gold resources, so that expanded legal mining can occur in a well-regulated manner. The illegal mining of gold, and other minerals, is not limited to a specific geographic origin. In South America many countries in the north and east have an equally large problem with illegal gold mining, the proceeds of which are transported over borders and often to the benefit of organised crime and other groups. If this gold fingerprinting program is successful, it could be expanded to include all these countries, which could eventually result in great benefits for them, and a reduction in crime.

8.11 NOVEMBER

8.11.1 Soil Science Australia, Australian Clay Society, National Soils Conference²

On 18-23 November 2018, IUGS-IFG Vice-chair, Prof Rob Fitzpatrick, presented at the Soil Science Australia, Australian Clay Society, National Soils Conference, in Canberra. The theme was '*Clay and soil minerals: Progress, prospects and future challenges*'.

8.11.2 House of Lords, Forensic Science Inquiry^{1,3,8,9,10,11}

In July 2018, the House of Lords Science and Technology Committee commenced an inquiry into forensic science. IUGS-IFG provided written evidence. The evidence became available, provided from a variety of organisations and individuals, on the following link.

<https://www.parliament.uk/business/committees/committees-a-z/lords-select/science-and-technology-committee/inquiries/parliament-2017/forensic-science/forensic-science-publications/>

8.11.3 Forensic Geology and Forensic Taphonomy¹

On 2-4 November 2018, IUGS-IFG was represented at an interdisciplinary symposium on taphonomic research in archaeology, forensic science and palaeontology. This took place at the University of Central Lancashire, UK. This event focussed on post-mortem processes and provided a detailed understanding of decomposition and preservation of remains associated with burials. Important to evaluate during police and law enforcement ground searches for burials. (<https://taphonomyuclan.wordpress.com/>)

8.11.4 IUGS-IFG First Forensic Geology Meeting in India^{1,9,28}

India, along with its co-host neighbouring countries Bangladesh, Nepal, Sri Lanka & Pakistan will host the 36th International Geological Congress (IGC) in, Delhi, 2-8 March 2020. From 11-14 November 2018, IUGS-IFG held for the first time in India, a series of planning meeting that were specifically aimed at establishing forensic geology in India. The objectives of the visit to India were as follows:

- Initiate forensic geology in India.
- Explore the levels of interests, possibilities and practicalities to hold a forensic geology session at IGC 2020; catalyst to initiate the development of forensic geology in India.
- Explore the scope and logistics of the IGC 2020 forensic geology session.
- Meet key stakeholders and collaborators including the 36th IGC Organising Committee.

The following meetings were held:

- Dr Amaranth Mishra, Amity University & Aspire Forensics.
- IUGS-IFG sub-committee for the Session on Forensic Geology at IGC 2020.
- Ms Punya Salila Shrivastava, Ministry of Home Affairs, Government of India.
- D S K Jain, Head and Director of all the Central Forensic Laboratories in India.
- Mr Javeed Ahmed, Director, National Institute of Criminology and Forensic Science.
- 36th IGC Organising Committee, including; Dr Snigdha Basu, Dr Saibal Ghosh, Directors, the Geological Survey of India and Dr. Prakash Golani (Secretary General of India's organising committee)

A preliminary draft scope for Forensic Session at IGC 2020, is as follows:

- Day 1: Introduction and key sessions, including the following:
 - a. Introduction
 - b. Session 1: Status of Forensic Geology in India
 - c. Session 2: Forensic Geology: Policing and Law Enforcement
 - d. Session 3: Forensic Geology: Environmental & Geotechnical
 - e. Session 4: Forensic Geology: Mining, Metals & Minerals
 - f. Session 5: Forensic Geology: Accreditation, Regulation, Geoethics
 - g. Discussion and Closure
- Day 2: Workshop for Delegates: Crime Scene Investigation, Geological Trace Evidence & Search (open to all delegates)
- Day 3: Workshop for Police & Forensic Scientists: Crime Scene Investigation, Geological Trace Evidence & Search (restricted and confidential)

8.11.5 Biohazard from a Cemetery, Confidential^{1,3,8,10}

IUGS-IFG was contacted to provide general guidance on the potential for cross contamination for a site located adjacent to a cemetery.

8.11.6 Forensic Canine and Search Papers¹

A forensic canine white paper was published on the internet and included the geological influences on canine search and detection. These were published by Martin Grime (formally UK Police and FBI Detector Dog Trainer), via the Burial Research Group, (Forensic Canine Research and Development Group), School of Law, Policing and Forensics, Staffordshire University, UK.

8.11.7 Defence College of Policing and Guarding¹

Collaboration with Dstl, Defence College of Policing and Guarding and University of Huddersfield at a site in the UK (Confidential).

8.11.8 Organisation of Scientific Areas Committee (OSAC), Texas^{4,5,7,8,10,12,13,14}

Members of IUGS-IFG were invited to attend the NIST, OSAC meeting in Houston, Texas, to discuss how the Geological Materials Group of OSAC were progressing with their guidance documents on analytical methods.

8.12 DECEMBER

Training with the Brazilian Federal Police¹⁶

From 3-7 December 2018, IUGS-IFG supported and endorsed training with the Brazilian Federal Police on forensic geology and microscopy. The course was held by the Brazilian National Police Academy of the Federal Police for forensic experts and academic researchers.

imaging, predictive spatial analysis. Analysis of forensic soils may be enhanced with DNA-based taxonomic identification, Raman microscopy, micromorphometry, among others.

8.12.1 IUGS-IFG Meeting with Geological Society Director of Science & Communications^{1,8}

On 4 December 2018, IUGS-IFG held a meeting with the Geological Society of London, Director of Science & Communications. The objective of the meeting was to provide an overview of the advancements in forensic geology, throughout the world, in the world decade. This also provided the opportunity to discuss future publications and matters including regulation, and accreditation of forensic geologists.

8.12.2 Archaeological Geophysics, Environmental & Criminal Forensics, London^{1,3,8,9,10,11,17,25,26}

A two-day meeting was held at the Geological Society of London, Burlington House, Piccadilly, London.

On 4 December, the Near Surface Geophysics Group of the Geological Society of London (NSGG) held the thirteenth in a succession of biennial day meetings devoted to archaeological geophysics. Near surface geophysical techniques have become increasingly established in archaeological research and evaluation over the past decade and are now routinely applied in archaeological investigations. This meeting offered a forum where contributors from the UK and further afield presented and debated the results of recent research and case studies. Suppliers of equipment and software also attended and the meeting represented an invaluable opportunity for both archaeological and geophysical practitioners to exchange information about recent developments.

On 5 December 2018, the session on Environmental & Criminal Forensics, was a multidisciplinary meeting that capture shared interests between the geological, environmental science, engineering, geotechnical, mining and archaeological communities with those practitioners working in the criminal and environmental fields. As this event was the first in the UK since the death of Dr Raymond Murray on 7 April 2018, a tribute presentation was delivered by Dr Laurance Donnelly. Dr Murray supported the establishment of IUGS-IFG and GSL-FGG. The sessions included use of such techniques to the intelligence community, novel methods of analysing forensic geoscience material, case and controlled studies, remote sensing, geochemistry, geophysics, etc. Both events attracted approximately 80 delegates on each day.

8.12.3 IUGS-IFG, Sub-Committee Meeting, London, UK^{1,3,8,9,10,11,17,25,26}

On 4 December 2018, IUGS-IFG held a sub-committee meeting in the Council Room, at the headquarters of the Geological Society of London. The following items were discussed as part of the agenda, and the meeting minutes are available on request:

- Welcome
- Committee changes
- Minutes of committee meeting, in Vancouver, 2018
- Web site
- A Guide to Forensic Geology
- Special Publication on Forensic Soil Science and Geology (Cape Town 2016)
- RFG 2018, Vancouver
- Collaboration with International Association for Prompting Geoethics (IAPG)
- American Geophysical Union 2018 and collaboration in Washington DC
- India 2018 and 36th IGC, in Delhi, India 2020
- CAST & DSTL
- 4th IberoAmerican Congress on Forensic Geology, Mexico, 2019
- House of Lords Inquiry on Forensic Science
- Forensic Soil Science in ENFSI APST Guidelines
- Forensic Geology in Australia, 2020
- IUGS Executive Committee meeting, Beijing, China, 2019
- Annual Report for 2018
- Programme for 2019
- Budget and finance 2018
- Budget and finance 2019
- Awards & recognition
- Any other business
- Next meeting

8.12.4 Forensic Geoscience Group (FGG), General Committee Meeting^{1,3,8,9,10,11,17,25,26}

IUGS-IFG was invited to attend the GSL-FGG General Meeting. FGG is regarded as the UK arm of IUGS-IFG. This event gave the opportunity to discuss future ideas for collaboration and publications.

8.12.1 From Crime Scene to Courtroom, (AGU), Washington DC, USA^{1,7}

On 14 December 2018, a session on Forensic Geology was held at the American Geophysical Union, in Washington DC. The objective was to highlighting a variety of methods including case studies and current practices. Geosciences are applied in the criminal justice system in numerous ways. Soil and other geological materials found on items of evidence can be compared to samples collected at a crime scene, while geophysical, remote sensing, and spatial analysis can aid in locating clandestine burial sites. Provenance studies focus on identifying potential source locations for geological evidence by comparing them with the known distribution of soils, rock types, and pollen. Due to the limited quantity of materials often obtained, many methods commonly used in geology and geochemistry are unsuitable for forensic characterisation of geological materials. This session highlights geoscience methods that can be applied in the criminal justice system including case studies, current practices, and forward-looking methods. Novel forensic geology methods may include LIDAR, multi-spectral

8.12.2 Federal Bureau of Investigation (FBI), Washington DC, USA^{1,7}

In December 2018, IUGS-IFG Chair, Dr Laurance Donnelly, was invited to visit the FBI Laboratory in Quantico, Virginia, Washington DC, USA. The principal objective of the visit was to exchange knowledge, information capabilities and experiences on the design and deployment of ground searches for burial related to homicide, serious organised crime and counter terrorism.

9 MAIN PRODUCTS AND OTHER ACTIVITIES IN 2018

9.1 Operational Support

IUGS-IFG was not specifically established to provide operational support for casework. However, throughout 2018 IUGS-IFG was regularly contacted by police and law enforcement and invited to provide geological advice or to aid and assist with their investigations.

9.2 Confidential Documents

IUGS-IFG produced technical and scientific reports, guidance and standard operational procedures (SOP), however, due to their status being either secret, confidential or restricted further details cannot be provided in this report.

9.3 National Crime Agency (NCA)

Members of IUGS-IFG were invited by the UK Police, National Crime Agency (NCA), to be retained on their database of 'Expert Advisers,' as forensic geologists.

9.4 Training Documents

IUGS-IFG produced presentations and documents for police and law enforcement.

9.5 Website

The updating and upgrading of the IUGS IFG web site commenced in 2018 and is expected to continue throughout 2019.

The Brazilian Federal Police propose to develop a web site on forensic geology, to be called 'IFG Brazil', which will be linked to the IUGS-IFG web site.

9.6 Flyer

In June 2018, the IUGS-IFG flyer was updated and electronically issued around the world and at conferences.

9.7 Geoforensic International Network (GIN)

Finland and Poland became included as members of the Geoforensic International Network (GIN). Those countries now represented in GIN include; Australia, Argentina, Belgium, Brazil, Canada, China,

Colombia, Egypt, England, Finland, France, Germany, Hungary, India, Iran, Ireland, Italy, Japan, Malta, Mexico, Namibia, New Zealand, Nigeria, Northern Ireland, Poland, Portugal, Russia, Scotland, South Africa, Spain, Sweden, Switzerland, Netherlands, United Arab Emirates, United States of America, Wales and the West Indies (Caribbean).

9.8 Certificates

IUGS-IFG certificates were issued to delegates who attended forensic geology training courses.

9.9 Newsletter

In June 2018, the IUGS-IFG newsletters was updated in both electronic and paper formats.

9.10 IUGS E-Bulletin

Throughout 2018, IUGS-IFG provided a monthly news summary for inclusion in the IUGS E-Bulletin.

9.11 Media

The events and activities of IUGS-IFG may attract media and public attention. Features have been included in broadsheets, tabloids, radio and TV interviews.

Generally, operational casework, past cases and cold cases are not discussed with the media. Unless specifically instructed and agreed in advance with the police, and investigating office in charge of the case.

IUGS-IFG are selective on those journalists we engage. Well-managed, pre-prepared and planned interviews with reputable journalists can bring significant benefits to IUGS, IFG and forensic geology. Preliminary and exploratory discussions took place in 2018, and these may advance in 2019. Any proposed media publications will be brought to the attention of the IUGS Executive Committee for review and approval.

9.12 Awards, Recognition, Promotion & New Positions

IUGS-IFG Treasure, Professor Lorna Dawson was awarded a CBE in the Queen's birthday list honours for services to Soil and Forensic Science. As part of the award ceremony in November 2018, Lorna was invited to speak at the Evensong ceremony in St Paul's Cathedral, in London.

IUGS-IFG Crime Scene Adviser (pending), Prof Pier Matteo Barone, was awarded, for the second consecutive year, Italian National Awards for Investigators and Forensic Experts. This was given for Excellence in Forensic Archaeology (including forensic geophysics).

IUGS-IFG Officer for Australia and the Pacific, Prof Shari Forbes accepted a position as Associate Professor of Forensic Science and Chemistry at University of Ontario Institute of Technology (UOIT).

IUGS-IFG Law Enforcement Adviser, Commander Mark Harrison, MBE (formerly UK National Police Search Adviser), was promoted from the Australian Federal Police to a position in the Australian Criminal Intelligence Commission.

IUGS-IFG Officer for Latin America, Dr Fábio Augusto da Silva Salvador was promoted to, 'Perito Criminal Federal, Chefe do Setor Técnico-Científico, Superintendência da Polícia Federal no Paraná, from 1 January 2019. He will become responsible for the Technical-Scientific Directorate of the Federal Police, in Brasilia.

IUGS-IFG Chair, Dr Laurance Donnelly, accepted a position as Head of Technical Services (Geologist) with AHK International.

10 PUBLICATIONS

10.1 A Guide to Forensic Geology

IUGS-IFG advanced the production of, '*A Guide to Forensic Geology*' that has been agreed for publication by The Geological Society of London. The editors are; Dr Laurance Donnelly, Prof Duncan

Pirrie, Dr Alastair Ruffell, Prof Lorna Dawson, CBE and Commander Mark Harrison, MBE. Throughout 2018, the chapters were written and most of these were reviewed. The final phase of the publication and review process are expected to continue into 2019. The contents are as follows:

- Acknowledgements
- List of Abbreviations and Acronyms
- Preface
- Chapter 1: Introduction
- Chapter 2: An Historical Overview of Forensic Geology
- Chapter 3: Ground Searches for Burials Related to Homicide Graves, Terrorism and Organised Crime
- Chapter 4: Crime Scene Examination
- Chapter 5: Geological Evidence Recovery from Exhibits
- Chapter 6: Geological Evidence Analysis
- Chapter 7: Illegal Mining, Conflict Minerals, Illicit Geological Fakes and Fraud
- Chapter 8: Reporting and Giving Evidence in Court
- References

10.2 Special Publication on Forensic Soil Science and Geology (GSLSpecPub17-125)

IUGS-IFG advanced the production of The Geological Society of London, Special Publication on '*Forensic Soil Science and Geology*'. The editors are Prof Rob Fitzpatrick and Dr Laurance Donnelly. The majority of the papers were presented at the, 'Symposium of Forensic Soil Science and Geology' and International Conference on, '*Criminal and Environmental Soil Forensics*,' held at the 35th IGC, in Cape Town, South Africa, in 2016. Ten papers have been submitted, reviewed and approved and four additional papers are expected to be finalised in the early part of 2019. Publication is scheduled in 2019.

10.3 White Paper and Episodes Article on Geoethics

Following the session on geoethics, held at the RFG2018 in Vancouver, in June 2018, keynote presenters from IFG and IAPG have submitted a joint paper on forensic geoethics that will be published in '*Episodes*', in 2019. A separate white paper on geoethics is also scheduled for publication in 2019.

10.4 European Meetings on Forensic Archaeology (EMFA)

IUGS-IFG provided a paper for the publication in the book, '*Multidisciplinary Approaches to Forensic Archaeology*', Edited by Dr Pier Matteo Barone and Dr W J Mike Groen. This volume contains papers presented during the last three European Meetings on Forensic Archaeology (EMFA) conferences. The papers include; archaeological theory and methodology, forensic geophysics, human taphonomy, 3D-scanning, illegal trade of artefacts and forensic geology. IUGS-IFG paper submitted by Dr Alastair Ruffell and Dr Laurance Donnelly on, '*Forensic Geophysics and the Search of Building Interiors, Peat Bogs and Water.*'

10.5 Geological Society of Japan

A publication on forensic geology, by the Geological Society of Japan, is scheduled for publication in 2019.

11 MAIN PROBLEMS ENCOUNTERED IN 2017

11.1 Funding

Funding provided by IUGS remains essential to enable IFG to progress. This also allows IFG to attract co-funding to deliver forensic geology events and for the global advancement of forensic geology.

11.2 The Professionalisation of Forensic Geology

The accreditation and regulation of forensic geology continues to be discussed and debated by IUGS-IFG. These are important so a third party can have assurance that a forensic geologist conforms to a suitable professional standard. Furthermore, it is desirable that those who practice forensic geology are formally recognised by an authoritative body as being competent to work to specified standards.

11.3 Alignment and Compliance with Forensic Science

IUGS-IFG is seeking to align and comply with standard forensic science best practise and guidance. IUGS-IFG is therefore awaiting the results of the House of Lords Inquiry into forensic science and will review, and where appropriate, consider the recommendations provided.

11.4 Confidentiality

IUGS-IFG promotes and develops forensic geology around the world. This can be particularly challenging at times since much of the work undertaken is confidential, often involving high profile or sensitive crimes, and as such cannot be published. Furthermore, many of the techniques and methods in forensic geology remain protected to ensure that criminals do not become forensically aware.

11.5 The Next Generation

IUGS-IFG is conscious of the need to attract the next generation of forensic geologists. As such, there is regular engagement with schools and universities including the provision of guest lectures and the design and delivery of course work at BSc and MSc level, and the provision of data and support for PhD and post-doctoral research.

12 WORK PLAN FOR 2019

The objectives for 2019 and beyond are to implement recommendations for the review conducted by IUGS ARC, and including the following:

12.1 Publications

- Publication of, *'A Guide to Forensic Geology'* (IUGS & The Geological Society of London).
- Publication of, *'Forensic Soil Science and Geology'* (IUGS & The Geological Society of London).
- Publication of, *'Forensic Geology'*, (Geological Society of Japan).
- Publication of, *'Geoethics in Forensic Geology'*, in association with the International Association for Promoting Geoethics. This includes the publication of a white paper and an article in *'Episodes'*.

12.2 Outreach, Knowledge Exchange, Capacity Building & Training

- Initiate forensic geology in India.
- Organise a Session on Forensic Geology, at the 36th International Geological Congress, in 2020, Delhi, India, and the provision of forensic geology training for forensic scientists, police and law enforcement.
- Co-organise the 4th Ibero-American Congress on Forensic Geology, in Puerto Vallarta, Jalisco, Mexico.
- Progress the potential for the provision of training on ground searches for burials associated with homicide, counter terrorism and organised crime in USA (confidential).
- Attendance at the 73rd IUGS Executive Meeting, 27-28 February, 1-2 March 2019, Beijing, China.
- Support and endorse session on Soil Forensics, at Australia and New Zealand Forensic Soil Society (ANZFSS), 22-25 September, Sydney.

- Support and endorse memorial event in honor of Dr Raymond Murray, Phoenix, Arizona (date to be confirmed).
- Provision of forensic geology support to CAST.

12.3 Committee & Governance

- Upgrade of the IUGS-IFG web site.
- Assign committee member for south-east Asia.
- Issue of IUGS-IFG Newsletter in 2019.
- Attract audiences in harder to reach communities such as, developing nations and young people.
- Enhance accessibility to IUGS-IFG materials through translation and distribution internationally an via the new IUGS-IFG web site.
- Engagement with forensic science regulators to align forensic geology with forensic science and following the publication of the UK House of Lords, Inquiry on Forensic Science.
- Assist police and law enforcement and develop guidance and best practise in forensic geology, globally.

13 CRITICAL MILESTONES

Critical milestones for 2018 included the following:

- The initiation of forensic geology in India, and the first forensic geology meeting in India. This included collaboration with the Ministry of Home Affairs, IGS Organising Committee, Geological Survey of India, Geovale Ltd, Amity University & Aspire Forensics, Central Forensic Laboratories, National Institute of Criminology and Forensic Science and Secretary General of India's organising committee).
- Advancement of, '*A Guide to Forensic Geology*' to be published by The Geological Society of London.
- Advancement of, '*Forensic Soil Science and Geology*' to be published by The Geological Society of London.
- Collaboration with the FBI and the transfer of knowledge on ground searches for burials.
- Support to the UK Home Office, Centre for Applied Science and Technology (CAST) and Defence Science and Technology Laboratory (Dstl), Search Technologies Academic Research Team (START).
- Invited speaker on forensic geology at the Italian House of Representatives Rome, Italy.
- Design and delivery of training in forensic geology for the Brazilian Federal Police.
- Design and delivery of training in forensic geology for Police Scotland.
- Collaboration with the International Association for Promoting Geodetics (IAPG).
- Submission of evidence to the House of Lords, Science and Technology Committee, Inquiry on Forensic Science.

14 ANTICIPATED OUTPUTS TO BE ACHIEVED FOR 2019

The main outputs expected for 2019 include the following:

- Publication of '*A Guide to Forensic Geology*' and '*Forensic Soil Science and Geology*', with the Geological Society of London, endorsed by IUGS.
- Publication on, '*Forensic Geology*' with the Geological Society of Japan.
- Publication of a white paper on, '*Geoethics and Forensic Geology*' and an article in '*Episodes*'.

- Publication of booklet of abstracts for the 4th Ibero-American Congress on Forensic Geology, in Mexico.
- Review paper on the applications of forensic geology in the management of risks associated with conflict minerals, mining, minerals and metals fraud, substitution and adulteration.
- IUGS-IFG training aids and presentations for training, knowledge transfer, capacity building and outreach events.
- Upgrade of the IUGS-IFG web site and the availability of information on forensic geology.
- Global distribution of the IUGS-IFG newsletter and flier.
- Contributions of the IUGS E-Bulletin.
- Selected articles on forensic geology in the media, in association with reputable and professional journalists.

15 FINANCIAL

15.1 Bank Account and Financial Management

The IUGS-IFG bank account remains in Aberdeen, Scotland, and is managed by the IUGS-IFG Treasurer, Prof Lorna Dawson. The accounts are verified by the IUGS-IFG Chair, Dr Laurance Donnelly.

15.2 Summary of Expenditure and Accounts for 2018

The income and expenditure on the account for 2018 is summarised in Table 15.1. As the IUGS-IFG bank account is held in the UK, the income and expenditure is shown in £ sterling and \$USD equivalent.

15.3 Estimated Budget for 2019

In 2018, IUGS-IFG was successful in attracting additional financial support and support in kind to assist with international events. IUGS-IFG will continue to request and obtain contributory funding and funding services in-kind, however, this relies on the core funding and ‘seed money’ that is gifted by IUGS. This approach is expected to provide a basis and for the continued global development and advancement of forensic geology.

In addition, in kind contributions by IUGS IFG staff time and the organisation they work in has allowed the many and varied contributions to have been achieved.

In 2019, IUGS-IFG proposes to generate a small surplus or to break even.

IUGS-IFG would request that we can ‘roll forward’ the current balance of USD\$ 1,380.80 to support events already agreed in 2019.

IUGS-IFG kindly requests the maximum available budget of USD\$ 15,000 funding from the IUGS Executive Committee for 2019 so IFG can continue to deliver the recommendations provided by the IUGS ARC in 2016 and proposed 2019 programme. An estimated breakdown of this budgetary request is provided in Table 15.2

EVENT IN 2018	CREDIT (£)	CREDIT (\$)	DEBIT (£)	DEBIT (\$)	BALANCE (£)	BALANCE (\$)
'A Guide to Forensic Geology' publications costs*			2,000	1,580	1,090.83	1,380.80
Web site running costs, 2018			197.50	250	3,090.83	
IUGS EC Meeting Beijing, China) February 2019*			790.00	1000	3,288.33	
Washington DC, USA, December 2018 (LJD)			789.30	999.11	4,078.33	
FGG & IFG, London, December 2018 (LD)			458.78	580.73	4,867.63	
India, planning for 36 th IGC (LJD)			789.30	999.11	5,326.41	
RFG2018, Vancouver (JM)			511.31	647.23	6,115.71	
RFG2018, Vancouver (FS)			769.00	973.42	6,627.02	
RFG2018, Vancouver (FS)			769.00	937.42	7,396.02	
RFG2018, Vancouver (RMDM)			769.00	973.42	8,165.02	
RFG2018, Vancouver (LD)			769.00	973.42	8,934.02	
Vancouver Committee meeting direct costs (LD)			177.31	224.44	9,703.02	c12,527.63
IUGS Award for 2018	5776.27	7311.74			9,880.33	
Balance at start of 2018					4,104.06	5,195.01
Carryover from 2017					646	825

Notes:

1. The above balances includes bank charges for international transactions.
2. (*) Denotes anticipated transactions in the first quarter of 2018.
3. Balance for end of GBP £1090.83 or USD \$1380.8
4. 1 USD=0.79 GBP at 20 December 2018

Table 15.1. Summary of budget and accounts for calendar year 2018 (20 December 2018).

PROPOSED EVENTS IN 2019	BUDGET COST (USD)
Ray Murray Memorial Event or Student Award and Event in Phoenix, Arizona	3,000
Mexico: 4 th Ibero-American Congress on Forensic Geology, Mexico IFG and Annual Committee Meeting	6,000
UK, Northern Ireland and India: Planning meeting for forensic session at IGC 2020	2,250
IFG Web site upgrade and running costs, 2019	1,250
The Netherlands: IFG Collaboration with Amsterdam Research Institute for Subsurface Taphonomy and Anthropology (ARISTA)	500
Translation of IFG Guide in different languages and review	500
Planning for Training in Search in USA	1,500
Budget request for 2019	15,000

Notes:

1. Request for \$ USD 15,000 including allocated spend on strategic initiatives
2. Request for \$ USD 15,000 excludes carryover from accounts in 2018 of £1090.83 (USD1380.80).
3. Funding may be diverted to events unknown in December 2018, but become apparent during 2019.

Table 15.2. Estimated and projected budget for 2019.

APPENDIX: SELECTED IUGS-IFG PHOTOGRAPHS FOR 2018



Ministry of Home Affairs, Delhi, India.



National Institute of Criminology and Forensic Science, Delhi, India.



Members of IUGS-IFG (Dr Biplob Chatterjee, Dr Jennifer McKinley, Dr Laurance Donnelly and Dr Satish Kumar, Queens University Belfast), attending a meeting at the Ministry of Home Affairs, Government of India, Delhi, India.



IUGS-IFG presented with a plaque from the Mr Javeed Ahmed, Director, National Institute of Criminology and Forensic Science, Delhi, India.



IUGS-IFG visit to the Organising Committee of the 36th International Geological Congress, Delhi, India.



Fake fossils to map the stratigraphy of part of the Himalayas, India. Fakes and fraud is proposed to be included in the forensic geology session at the 36th IGC, in Delhi, 2020.



IUGS-IFG at the 3rd Ibero-American Seminar on Forensic Geoscience, in La Plata, Argentina.



Members of the IUGS-IFG Committee at Resourcing future Generations, Vancouver, Canada.



IUGS-IFG at the 3rd Ibero-American Seminar on Forensic Geoscience, in La Plata, Argentina



IUGS-IFG represented at the human remains decomposition facility, Amsterdam, Netherlands.



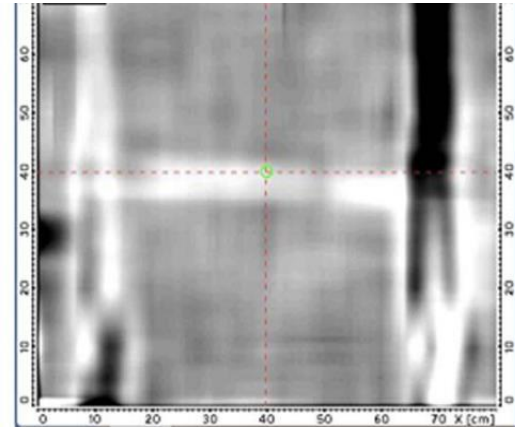
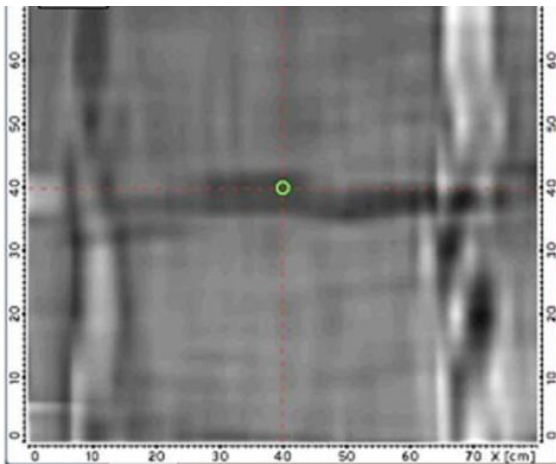
Conference on Environmental and Criminal Forensics, Forensic Geoscience Group, London.



Colombian Gold Fingerprinting Project, University of Pretoria, Colombian Geological Survey.



IUGS-IFG sub-committee meeting, London, December 2018.

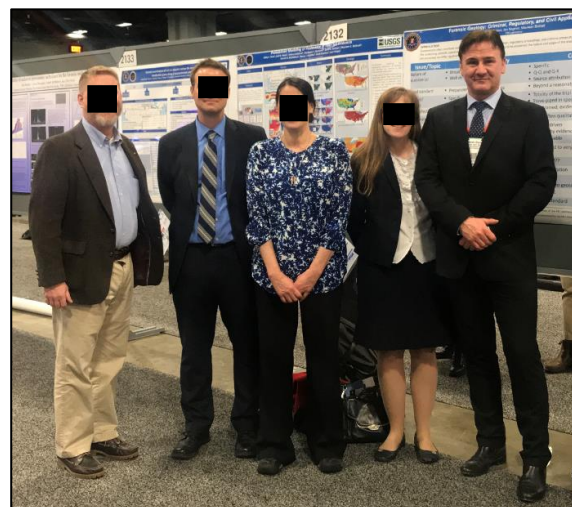


Sideways GPR deployed to detect voids (After Ruffell and Donnelly 2018, in Barone and Groen 2018).

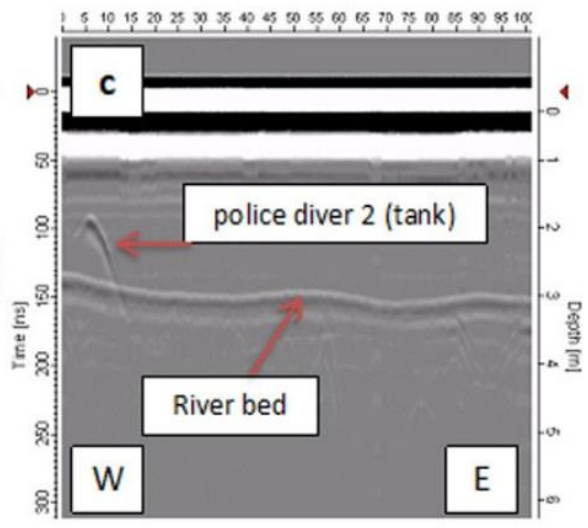
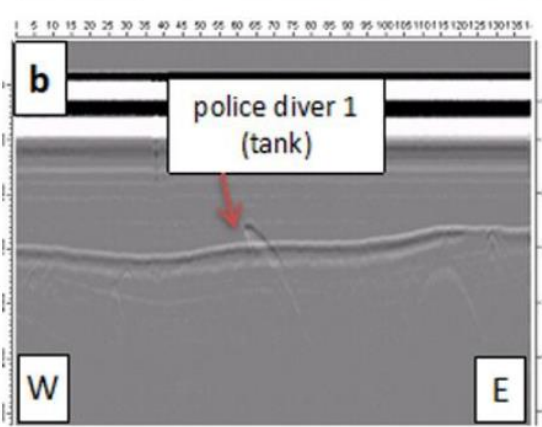
Upside GPR deployed to detect voids (After Ruffell and Donnelly 2018, in Barone and Groen 2018).



Environmental and Criminal Forensics, Geological Society of London, December 2018.



IUGS-IFG Chair, with FBI geologists and research scientists at the Forensic Geology Session, of the American Geophysical Union (AGU), December 2018.



Water Penetrating Radar data gathered in the River Lagan, Belfast (Northern Ireland, UK) as part of a police search for a homicide victim (body later recovered and shown to have been murdered). 250MHz WPR data gathered as the boat was steered over each diver, showing the clear hyperbolae from the position of the diver (observed under the boat) (After Ruffell and Donnelly 2018, in Barone and Groen 2018).



IUGS IFG Officer for Europe, Dr Rosa Maria Di Maggio at the Italian House of Representatives.

GIORNATA DI STUDIO SUL TEMA
GEOLOGIA FORENSE
APPLICAZIONI E CASI DI STUDIO

ORGANIZZATO DA
 SIGEA www.sigeaweb.it ABEO s.r.l. EFA006 CNG - www.formazione.abeo.it

CON IL PATROCINIO DI

NAPOLI, 4 MAGGIO 2018
 Pan I Palazzo delle Arti Napoli "Sala Di Stefano"
 Via dei Mille, 60 • Ore 09.00 - 18.30

La giornata di studio intende introdurre le applicazioni delle tecniche geologiche che possono essere utilizzate nelle indagini relative a casi giudiziari sia civili che penali. La geologia forense risulta di estrema importanza nello studio del territorio nel caso di numerose tipologie di reato, tra cui illeciti contro l'ambiente, la persona e il patrimonio. I singoli contributi della giornata di studio saranno finalizzati a introdurre le differenti fasi di intervento del geologo forense offrendo diverse casistiche ed esponendo numerosi casi di studio.

PROGRAMMA

08.00 - 08.30 Registrazione partecipanti
 08.30 - 09.00 Saluto: **Gaetano Sammartino** (Presidente Sigea sezione Campania Molise) e **Egilio Grasso** (Presidente Ordine Geologi della Campania)
 09.00 - 09.30 Introduzione sulle applicazioni delle geologie forense
 09.30 - 11.30 La fotointerpretazione in campo forense: applicazioni e casi di studio
 11.30 - 13.30 Tecniche geofisiche applicate alle indagini giudiziarie
 13.30 - 14.30 *Pausa pranzo*
 14.30 - 16.00 Cenni di legislazione e procedura civile e penale
 16.00 - 18.00 Lo studio dei terreni in ambito forense
 18.00 - 18.30 Test di verifica finale

Docenti: Pier Matteo Barone (Geosciences Forensi Italia ©, American University of Rome)
 Rosa Maria Di Maggio (Geosciences Forensi Italia ©), Roberto Graciotti (ISPPA)
 Responsabilità scientifica: Daniele Baldi (Sigea)
 Coordinamento didattico dell'evento per la Sigea: Enrico Gennari & Antonello Fiore
 Quota di partecipazione: 80€ + 20€ per il test di verifica finale facoltativo (IVA esente).
 Per i soci Sigea e gli iscritti all'Ordine dei Geologi è previsto il 10 % di sconto.
 Crediti Formativi: Sono stati richiesti i crediti FC per i geologi: 8 crediti per la frequenza e 4 crediti aggiuntivi con il superamento con esito positivo della verifica finale.
 Per iscrizioni consultare il sito www.formazione.abeo.it

AGEVOLAZIONI: Gli iscritti alla giornata di studio potranno usufruire di uno sconto sulla quota d'iscrizione alla prossima edizione del Master universitario II livello in "Geologia forense e illeciti ambientali" organizzato dall'Università di Camerino - Scuola di Scienze e Tecnologie.

1 of 1
GIORNATA DI STUDIO SUL TEMA
GEOLOGIA FORENSE
APPLICAZIONI E CASI DI STUDIO

ORGANIZZATO DA
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CON IL PATROCINIO DI

MESTRE, 11 MAGGIO 2018
 Ordine Regionale Geologi "Sala Vittorio Illico"
 Riviera XX Settembre, 23 • Ore 09.00 - 18.30

La giornata di studio intende introdurre le applicazioni delle tecniche geologiche che possono essere utilizzate nelle indagini relative a casi giudiziari sia civili che penali. La geologia forense risulta di estrema importanza nello studio del territorio nel caso di numerose tipologie di reato, tra cui illeciti contro l'ambiente, la persona e il patrimonio. I singoli contributi della giornata di studio saranno finalizzati a introdurre le differenti fasi di intervento del geologo forense offrendo diverse casistiche ed esponendo numerosi casi di studio.

PROGRAMMA

08.00 - 08.30 Registrazione partecipanti
 08.30 - 09.00 Saluto: **Andrea Pizzigallo** (Presidente Ordine Regionale Geologi della Campania) e **Paolo Scudato** (Presidente Ordine Regionale Geologi della Campania)
 09.00 - 09.30 Introduzione sulle applicazioni delle geologie forense
 09.30 - 11.30 La fotointerpretazione in campo forense: applicazioni e casi di studio
 11.30 - 13.30 Tecniche geofisiche applicate alle indagini giudiziarie
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 16.00 - 18.00 Lo studio dei terreni in ambito forense
 18.00 - 18.30 Test di verifica finale

Docenti: Pier Matteo Barone (Geosciences Forensi Italia ©, American University of Rome)
 Rosa Maria Di Maggio (Geosciences Forensi Italia ©), Roberto Graciotti (ISPPA)
 Responsabilità scientifica: Daniele Baldi (Sigea)
 Coordinamento didattico dell'evento per la Sigea: Enrico Gennari & Antonello Fiore
 Quota di partecipazione: 80€ + 20€ per il test di verifica finale facoltativo (IVA esente).
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 Per iscrizioni consultare il sito www.formazione.abeo.it

AGEVOLAZIONI: Gli iscritti alla giornata di studio potranno usufruire di uno sconto sulla quota d'iscrizione alla prossima edizione del Master universitario II livello in "Geologia forense e illeciti ambientali" organizzato dall'Università di Camerino - Scuola di Scienze e Tecnologie.

1 of 1
GIORNATA DI STUDIO SUL TEMA
GEOLOGIA FORENSE
APPLICAZIONI E CASI DI STUDIO

ORGANIZZATO DA
 SIGEA www.sigeaweb.it ABEO s.r.l. EFA006 CNG - www.formazione.abeo.it

CON IL PATROCINIO DI

CIVITANOVA MARCHE, 25 MAGGIO 2018
 COSMOPOLITAN HOTEL • Ore 09.00 - 18.30

La giornata di studio intende introdurre le applicazioni delle tecniche geologiche che possono essere utilizzate nelle indagini relative a casi giudiziari sia civili che penali. La geologia forense risulta di estrema importanza nello studio del territorio nel caso di numerose tipologie di reato, tra cui illeciti contro l'ambiente, la persona e il patrimonio. I singoli contributi della giornata di studio saranno finalizzati a introdurre le differenti fasi di intervento del geologo forense offrendo diverse casistiche ed esponendo numerosi casi di studio.

PROGRAMMA

08.00 - 08.30 Registrazione partecipanti
 08.30 - 09.00 Saluto: **Enrico Gennari** (Presidente Sigea sezione Marche) e **Paolo Scudato** (Presidente Ordine Regionale Geologi della Campania)
 09.00 - 09.30 Introduzione sulle applicazioni delle geologie forense
 09.30 - 11.30 La fotointerpretazione in campo forense: applicazioni e casi di studio
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Soil Forensics

Pier Matteo Barone · W. J. Mike Groen
 Editors

Multidisciplinary Approaches to Forensic Archaeology

Topics discussed during the European Meetings on Forensic Archaeology (EMFA)

Springer

Forensic Geology events held on 4, 11 and 25 March in Italy, supported by IUGS-IFG. IUGS-IFG contributed to the publication, 'Multidisciplinary Approaches to Forensic Archaeology'.

Curso

Geologia Forense e Microvestígios

Ementa:

- Panorama da Geologia Forense no Brasil e no Mundo**
PCF Dr. Fábio Augusto da Silva Salvador (SETEC/SR/PF/PR)
- Análise forense de vestígios de solo em local de crime**
Dr. Vander de Freitas Meilo (UFPR)
- Geofísica forense na investigação do subsolo**
PCF Dr. Marcelo Blum (INC/DITEC)
- Aplicação dos isótopos estáveis na identificação humana**
Dra. Anelize Bahniuk Rumbelsperger (UFPR)
- Palinologia forense**
Ma. Marina Mianello (SPTC/SP)

Data: 03/12 (Seg) - 07/12/18 (Sex)
Carga Horária: 32h
Local: SR/PF/PR, Curitiba
Avaliação: não há

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Lords Select Committee

Forensic Science

Deadline: 14 September 2018.

Dear Laurance Donnelly

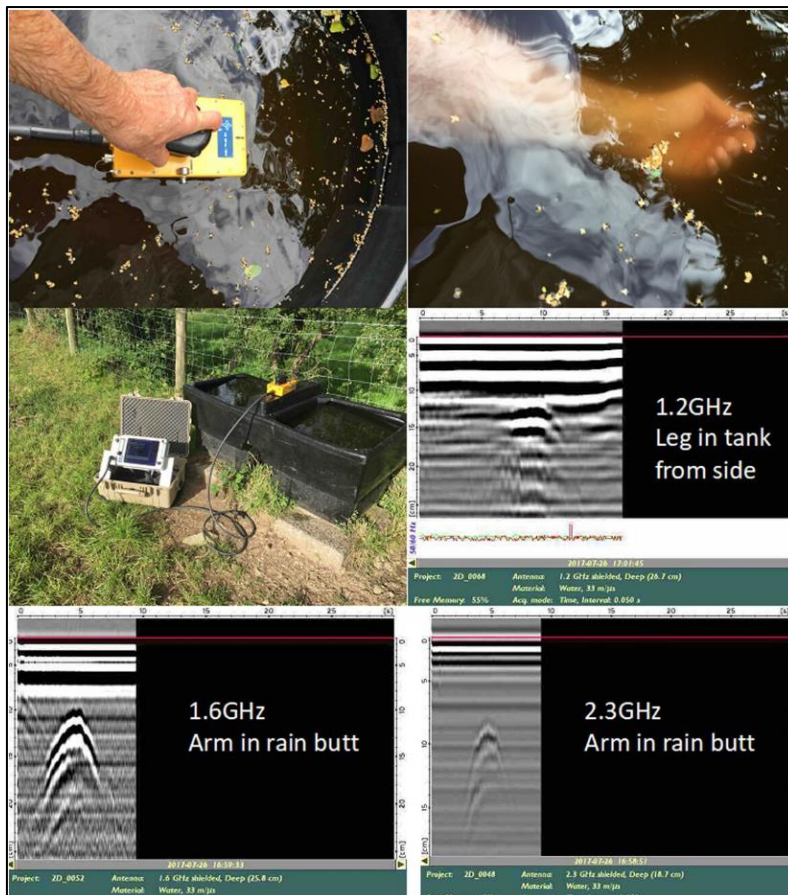
Thank you for submitting your evidence to the above committee inquiry on behalf of IUGS Initiative on Forensic Geology.

You will receive an email to geologist@hotmail.co.uk in the next 24 hours.

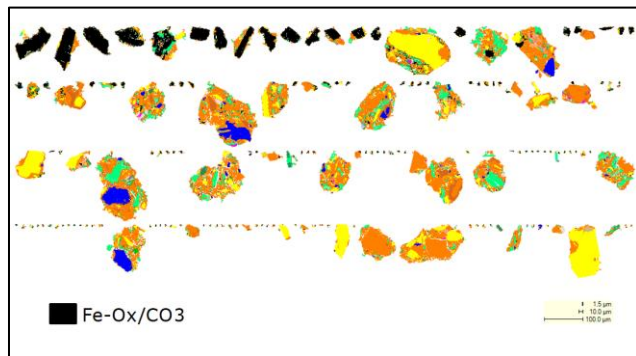
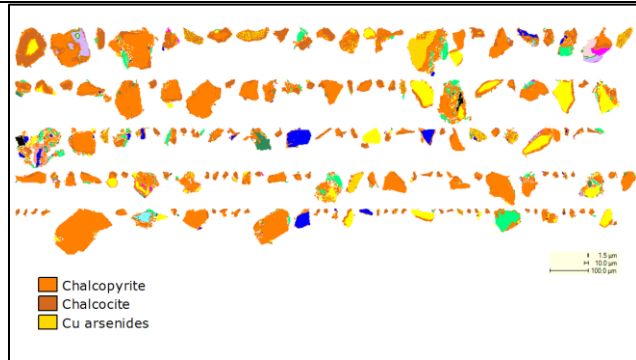
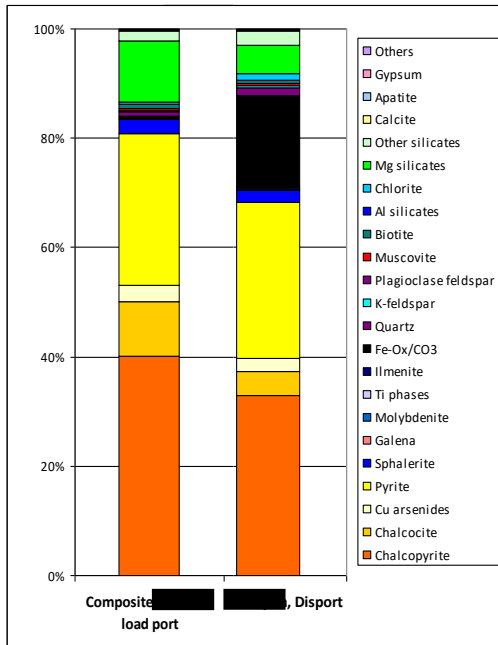
The email will contain information about next steps.

For more information and the latest news visit the Committee's website

Forensic Geology in Latin America. Left, IUGS-IFG Training in Forensic Geology and Micro-investigations with the Brazilian Federal Police. Right, IUGS-IFG submission to the House of Lords, Inquiry on Forensic Science.



Experimental high frequency WPR data gathered (orthogonal) across a live human arm and a rain butt (After Ruffell and Donnelly 2018, in Barone and Groen 2018).



Qemscan analysis for sample at loadport in (upper) and sample at disport (lower). The latter indicates increased amount of magnetite potentially from adulteration of the samples prior to analysis.



IUGS-IFG Chair, visit to FBI Laboratory to advise on ground searches for burials related to homicide graves, counter terrorism and serious organised crime, Washington DC, USA.

Forensic Geology

Forensic geology (also known as Forensic Geoscience or Geoforensics) is the application of geology to policing and law enforcement, which may potentially be applicable to a court of law.

Forensic geology assist police and law enforcement in relation to: serious crimes (homicide, rape, and sexual assaults), organized crime, counter terrorism, kidnapping, humanitarian incidents, environmental crimes, wildlife crime, precious minerals substitution, metals theft, fraudulent crimes, fakes, geohazards, geotechnical engineering, engineering geology, ground searches for buried graves and other concealed items and water searches.



Search

Ground searches for burials may be designed and implemented to locate homicide graves, mass graves related to genocide, weapons, firearms, improvised devices, explosives, drugs and items of value (e.g. stolen items, money, coinage, jewellery, etc).

Crime Scene Investigation

Crime scene investigations may be required to assist the police or forensic scientists at a crime scene to collect geological samples and provide specialised maps and interpretations of the soil, sediment, rocks, micro-fossils, and man-made materials.

Geological Trace Evidence

Geological trace evidence involves analysis, interpretation, presentation and explanation of geological evidence, often at a scene of crime or from an item or object as intelligence and as evidence. Geological trace evidence includes: rock fragments, natural soils and sediments, artificial (anthropogenic) man-made materials derived from geological raw materials (such as bricks, concrete, glass or plaster board) or micro-fossils. Trace evidence may be transferred onto the body, person or the clothing of a victim or offender or onto vehicles or objects from and to a crime scene. This, when interpreted by an experienced forensic geologist can help with crime reconstruction and may be admissible in a court.

Events & Collaboration

- Brazilian Federal Police and National Institute of Criminology
- Colombian Federal Police
- Russian Federal Centre for Forensic Science, Ministry of Justice, Moscow
- China and Institute of Forensic Science, Ministry of Public Security, Division of Trace Evidence Analysis
- An Garda Síochána and Independent Commission for the Location of Victims' Remains, Ireland
- Australian Federal Police



- UK Police Forces, National Crime Agency, Police National Search Centre, Home Office (CAST) & British Military
- Trace Evidence Working Group of the Asia Forensic Sciences Network Forensic Geoscience, Singapore
- Interpol General Secretariat Headquarters, Lyon, France
- National Research Institute of Police Science, Japan
- Police Scotland
- Denver Police and Police Commission, Missoula, USA
- Geological Society of London & Geological Society of America
- Abu Dhabi Police, Navy & Coast Guard
- European Geosciences Union, General Assembly
- Forensic Geoscience, Chiba, Japan
- La Guardia Civil, Alcalá de Henares, Spain.
- Australian Facility for Taphonomic Experimental Research
- The California Association of Criminalists & American Association of Trace Evidence Examiners
- Missing Persons in Argentina and Chile
- European Academy of Forensic Sciences



Version 1.5



IUGS-IFG Objective

The IUGS Initiative on Forensic Geology (IFG) seeks to:
'Develop forensic geology internationally and promote its applications.'



www.forensicgeologyinternational.org

IUGS-IFG Committee Officers

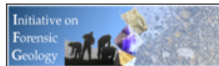
Chair: Dr Laurance Donnelly
IUGS Initiative on Forensic Geology, England
geologist@hotmail.co.uk
Vice Chair: Prof Rob Fitzpatrick
CSIRO, Australia
Rob.Fitzpatrick@csiro.au
Treasurer: Prof Lorna Dawson
James Hutton Institute, Scotland
lorndawson@hutton.ac.uk
Secretary: Marianne Stam, USA
California State Justice Department, USA
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Pacific: Prof Shari Forbes
Russia & CIS: Dr Olga Gradusva, Dr Ekaterina Nesterina
USA: Dr Bill Schneck

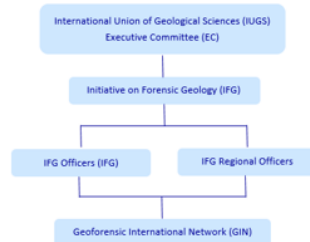
IUGS-IFG Objectives

- The objectives of the IUGS-IFG are to:
1. Collate and disseminate data and information on forensic geology applied to policing and law enforcement, criminal, environmental and civil investigations;
 2. Promote international meetings, seminars, conferences and training;
 3. Develop a 'Committee' to act as principal advisers, collaborators and active participants;
 4. Develop an international network whereby each 'member' will act as a principal contact in their respective country for the collation and dissemination of information on forensic geology;
 5. Collate, make available and where appropriate review any existing documentation and publications in forensic geology; and
 6. Produce a document endorsed by the Committee to be called: 'A Guide to Forensic Geology'.



IUGS-IFG Governance

The International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG) was launched at the 62nd Executive Committee meeting of the IUGS, at UNESCO headquarters, in Paris, France, on 22 February 2011. The IUGS-IFG Committee comprises representatives from major geographical regions of the world and includes specialists from: academia, industry, consultancy, operationally based forensic geologists, the police, law enforcement agencies and forensic organisations.



IUGS-IFG Approach

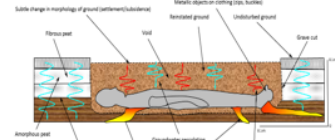
IUGS-IFG aims to raise the global awareness of forensic geology by holding meetings and conferences, promoting research, teaching, training and the operational deployment of forensic geologists and includes the following:

Outreach: This provides education and information to a range of stake holders that include: geologists, geoscientists, police officers, law enforcement organisations, the public, schools and universities, engineers, lawyers and the legal profession, forensic scientists, the media and politicians.

Knowledge transfer and capacity building: This raises the levels of awareness and knowledge, and provides information about forensic geology; and

Technology transfer and training: This provides improvement in skill sets.

Publications: This includes peer review papers, technical guidance, popular press articles, conference proceedings and media articles.





IUGS-IFG Treasure, Professor Lorna Dawson was awarded a CBE in the Queen’s birthday list honours for services to Soil and Forensic Science.



IUGS-IFG Crime Scene Adviser (Pending), Dr Pier Matteo Barone, receives an award for the second consecutive year, Italian National Awards for Investigators and Forensic Experts.

The Geoforensic Search Strategy: Methods and Procedures to Locate Concealed and Buried Targets Associated with Homicide, Terrorists or Serious and Organized Crime

¹Dr Laurance Donnelly *BSc (Hons), PhD, CGeol, CSci, EurGeol, FGS, FGSA* ²Prof Mark Harrison *MBE*
¹ Founder and Chair, International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG),
²IUGS-IFG Law Enforcement Adviser, Australian Criminal Intelligence Commission & University of Canberra

Introduction

The geoforensic search strategy combines best practice law enforcement search protocols and procedures and fundamental geological techniques.

The ground is a link between water geologists and law enforcement and police officers. Without the ground being explored to locate natural resources, investigated to provide the geotechnical parameters and geotechnical assessments to assist in locate concealed structures or victims, an understanding of the ground is essential.

The need to conduct complex, open area searches for buried targets together the very different yet complementary experiences of a geologist and a law enforcement officer, both concerned in the ground, but from differing perspectives, is a novel and innovative search strategy development.

A law enforcement perspective provides an indication of the activities, motives and intentions, behavioral profiling, intelligence assessment, management of search areas, tactical planning, identification of aerial imagery, classification of search types, prior and media management, family liaison, crime scene management, forensic recovery and recording, knowledge and knowledge.

A geological perspective provides a means to assess local soil nature, collation and assessment of geological data and information as part of a desk study, geological evaluation of intelligence and aerial imagery, reduction of geomorphology and hydrology, determination of physicochemical, geotechnical and geotechnical properties, assessment of target detectability, approval of digability and the production of a conceptual geological model for the target.

The combined approach enabled an appropriate selection of search assets to be identified. A program, presentation and cost-effective methodology was then devised to provide the highest level of assurance for the presence or absence of the target suspected by the law enforcement officer or police officer. To have been based as part of a criminal act. The approach became verified and refined over a decade and the identified search strategy for open and ground searches, has since been adopted for ground searches in the UK and internationally.

Number of spatial locations to search for a target (Donnelly & Harrison 2012)

Total area of geological data and information for search areas (Donnelly, Biological Society & Scientific Institute)

Pre-search

Figure 1: Pre-search (Donnelly, Harrison & Nelson 2012)

Stable change in morphology of ground (contour lines, subsidence)

Metallic objects on surface (e.g., toys, bottles)

Concept of hydrogeological (H2O) in a shallow confined, fissile zone (Donnelly, 2012) or (Donnelly & Harrison 2012)

Site in evidence

Concept of hydrogeological (H2O) in a shallow confined, fissile zone (Donnelly, 2012) or (Donnelly & Harrison 2012)

Search

Figure 2: Search (Donnelly, Harrison & Nelson 2012)

Search methodology using various based searching and hidden target searching (see 2012) (Donnelly & Harrison 2012)

Stability and soil geotechnical maps showing areas of search priority. Soil maps are not possible to provide more detail beyond a basic level or an aerial or ground level view. This enables search resources to be focused for a targeted, coordinated and progressive search (Donnelly, Harrison & Nelson 2012)

Figure 3: Search (Donnelly, Harrison & Nelson 2012)

Figure 4: Search (Donnelly, Harrison & Nelson 2012)

Figure 5: Search (Donnelly, Harrison & Nelson 2012)

Post-search

Figure 6: Post-search (Donnelly, Harrison & Nelson 2012)

Figure 7: Post-search (Donnelly, Harrison & Nelson 2012)

Figure 8: Post-search (Donnelly, Harrison & Nelson 2012)

Figure 9: Post-search (Donnelly, Harrison & Nelson 2012)

IUGS-IFG Poster on Forensic Geology and Ground Searches for Burials (Source: Laurance Donnelly)



Dr Raymond C Murray, Forensic Geologist

Dr Raymond C Murray, Forensic Geologist, died on 7th April 2018, aged 88. His first forensic case was in 1973 when he analysed soil on behalf of an agent from the US Bureau of Alcohol, Tobacco and Firearms. He co-authored the first text book on forensic geology in 1975. Dr Murray was inspirational, charismatic and a leading pioneer in forensic geology. Forensic geology would not have advanced to the level it is today if it was not for the work of Dr Murray. He encouraged the establishment of the Geological Society of London, Forensic Geoscience Group (FGG) and in 2010 he became the first recipient of the FGG award. He was the IFG Honorary Committee Member, and he supported IFG throughout the world. His legacy and global contributions to forensic geology will continue for generations within the police, law enforcement and geology.

For further information

<http://www.forensicgeologyinternational.org> or <http://www.forensicgeologyinternational.org>



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