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INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

INITIATIVE ON FORENSIC GEOLOGY (IFG)

SUMMARY 2016 TO 2020



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**International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG)
Summary 2016-2020**

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**INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)
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SUMMARY, 2016 TO 2020**

A. IFG COMMITTEE

The following changes were made to the IUGS-IFG Committee:

1. Dr Brian Johnston, was assigned to the IFG Committee to develop the new web site (2020).
2. Dr Elisa Bergslien was appointed as the Officer for the Geoforensic International Network (GIN) (2020).
3. Dr Roger Dixon (IUGS-IFG Officer for Africa), passed away in 2020 a committee member for Africa is pending (2020).
4. Prof Pier Matteo Barone, based at the American University of Rome, became formally assigned to the IFG Committee as the, 'Crime Scene Adviser' (2019).
5. The position of 'Honorary Committee Member' of IUGS-IFG no longer exists following the death of Dr Raymond Murray (2018).
6. Dr Biplob Chatterjee was appointed to the IUGS-IFG Committee as the Officer for India (2018).
7. Prof James Robertson retired as IUGS officer for Australia (2017) this position was managed by Commander Mark Harrison and Prof Robert Fitzpatrick.
8. Dr Guo Hongling, Institute of Forensic Science, Ministry of Public Security, Division of Trace Evidence Analysis, in China, was assigned to the IUGS-IFG Committee as the Officer for China (2016).
9. Dr Ritsuko Sugita, who was the Officer for Asia focussed on developing and promoting forensic geology in Japan (2016).
10. IUGS-IFG annual committee meetings and sub-committee meetings were held as follows, the minutes are available on request:
 - a. 18 May 2020, video conference.
 - b. 28 October 2019, Puerto Vallarta, Mexico
 - c. 12 November 2019, New Delhi, India
 - d. 10 July 2019, Orlando, Florida, USA
 - e. 4 December 2018, London, United Kingdom
 - f. 21 June 2018, Vancouver, Canada
 - g. 6 March 2017, London, United Kingdom
11. IUGS-IFG was represented at the following IUGS Executive Committee Meetings:
 - h. 75th EC Meeting (UNESCP, Paris, 29-30 October 2020), video conference
 - i. 74th EC Meeting (Busan, South Korea, 15-16 February 2019).
 - j. 73rd EC Meeting (Beijing, China, 27-28 February 2019)
 - k. 72nd EC Meeting (Potsdam, Germany, 23-24 January 2018)
 - l. 71st EC Meeting (Paris, France, 15-17 February 2017)
 - m. 70th EC Meeting (Cape Town, South Africa, 26-27 August 2016)
 - n. 69th EC Meeting (Kunming, China, 18-19 January 2016)



12. The IUGS Ad Hoc Review Committee (ARC) conducted a mandatory, formal review of the progress of IFG, under the Chairmanship of Prof Jose Calvo, Secretary General of IUGS. The other attendee at the meeting was Prof Marko Komac, Vice-President of IUGS, Dr Alastair Ruffell and Colin Hope (UK Police National Search Adviser). A highly favourable review recommended the continuation of IFG as part of IUGS (2016).
13. IUGS-IFG provided a monthly contribution for the IUGS E-Bulletin (2018-2020).

B. PROFESSIONAL

1. UK based members of IUGS-IFG are listed with the NCA as Expert Advisers (Forensic Geologists) to provide support to the British police (2020).
2. The Abu Dhabi Police (ADP) has approved the establishment a forensic geology branch and laboratory. This will assist with the analyses of geological trace evidence, searching for corpses, hidden weapons and smuggled containers and the analysis of gold and minerals. IUGS-IFG has been collaborating with ADP forensic geologists and has visited Abu Dhabi on two previous occasions to discuss developing forensic geology (2020).
3. A series of meetings were held in Burnley, Lancashire, UK, to discuss the Geoforensic Search Strategy (GSS). This is a new and innovative method to provide law enforcement with a high assurance search, combining geological and law enforcement methods. The GSS will be published in 2020 as a chapter in, 'A Guide to Forensic Geology'. At this meeting, existing and innovative methods to mitigate risks associated with crimes that take place in the mining, minerals and metals industry were also considered (2019).
4. IUGS-IFG was invited by the Organizations of Scientific Areas Committees (OSAC) to its annual Forensic Science meetings in Orlando, Florida. OSAC works in conjunction with the National Institute of Standards and Technology (NIST) to coordinate the development of standards and guidelines in order to improve the quality and consistency of the forensic science community's work. Members of IUGS-IFG were invited to attend this OSAC-NIST meeting with regards to geological trace evidence collection and analysis (2019).
5. 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 (2018).
6. IUGS-IFG and the International Association for Promoting Geoethics (IAPG) signed an agreement to promote a coordinated policy for promoting initiatives and events of common interest (2017).
7. IUGS-IFG became affiliated to the Geological Society of London, Corporate Affiliate Scheme (2017).
8. IUGS-IFG supported the Forensic Archaeology Special Interest Group and the Chartered Institute for Archaeologists (CIfA), at the University of Bradford, Department of Forensic Archaeology. This included the provision of advice on professional practice with police and law enforcement (2016).
9. IUGS-IFG marked the 10th anniversary of the establishment of, 'The Forensic Geoscience Group (FGG) of The Geological Society of London (GSL)'. This is the newest of the Geological Society's 23 Specialist Groups and Joint Associations, established by Laurance Donnelly (IUGS-IFG Chair) in 2006 (2016).
10. IUGS-IFG engaged with the European Network of Forensic Science Institutes (ENFSI) for the development of common laboratory practices in forensic geoscience and soil science (2016).
11. IUGS-IFG assisted the Australian Federal Police (AFP) with expressions of interest for an opportunity with AFP Forensics, Soil Capability Implementation. This was to assist with the further development and implementation of a provenancing capability within its forensics portfolio and soil examinations (2016).



12. IUGS-IFG supported Abu Dhabi Police following their request for the identification of a suitably qualified and experienced forensic geology to join the Abu Dhabi Police, Forensic Geology Group. IUGS-IFG was able to identify suitable candidates from around the world whose details were forward on to Abu Dhabi Police for their consideration (2016).
13. IUGS-IFG committee members continued to support the Forensic Geological Subcommittee of the Organization of Scientific Area Committee for Forensic Science (OSAC), Scientific Working Group for Geological Materials (SWGCEO), Arizona, USA (2016).

C. GOVERNMENT COLLABORATION

1. A report was issued by the UK Parliament, House of Lords Inquiry into Forensic Science. IUGS-IFG submitted evidence for this inquiry, and the IUGS-IFG Forensic Science Adviser served as the Specialist Adviser to the Committee (2018-2020).
2. 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 (2016-2020)
3. IUGS-IFG was invited to visit the FBI Laboratory in Quantico, Virginia, Washington DC, USA. The principal objective of the visits in 2018 and 2019 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 (2018-2019).
4. 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 (2018).
5. IUGS-IFG collaborated with Defence Science and Technology Laboratory (Dstl), Defence College of Policing and Guarding, UK (2018).
6. IUGS-IFG visited the Indian Government to initiate forensic geology in India. Meetings were held with; the Ministry of Home Affairs, Government of India; Head and Director of all the Central Forensic Laboratories in India; Head and Director of all the Central Forensic Laboratories in India; National Institute of Criminology and Forensic Science; 36th IGC Organising Committee; the Geological Survey of India; Amity University and Aspire Forensics (2018).
7. IUGS-IFG submitted written evidence for the House of Lords, Science and Technology Committee inquiry into forensic science (2018-2019).
8. IUGS-IFG were selected and invited as subject matter experts to participate in a project as part of the UK Governments remit to cut crime and deliver justice in the UK, with the Home Office Centre of Applied Science and Technology (CAST). In 2018 CAST became officially integrated into the Defence Science and Technology Laboratory (Dstl) (2017-2019).
9. IUGS-IFG was invited by the Italian House of Representatives (the Italian Parliament) to deliver a presentation on forensic geology on 'The Missing: Social, Technical and Juridical Issues' (2018).
10. IUGS-IFG were invited to participate on a debate that focused on the technical, practical and ethical issues on a UK Human Decomposition Facility for research purpose (2017).
11. IUGS-IFG provided the Home Office, Search Technology User Group (STUG) with an outline scope for possible collaboration at the European Taphonomy Research Centre in Amsterdam (2017).
12. Environmental crime has been reported by UNEP-INTERPOL to be a growing concern. IUGS-IFG spoke at Stormont, in Northern Ireland, about this to help inform Government on Policy. The illegal burial of waste has been a particular problem in Italy, Canadian and Ireland (2016).
13. IUGS-IFG visited China to develop links with the China Institute of Forensic Science, Ministry of Public Security, Division of Trace Evidence Analysis, China. Subsequently, China became affiliated

to IUGS-IFG (2016).

14. IUGS-IFG met with a delegation from Chile to discuss the Chilean, UK and Northern Ireland experience regarding the search, recovery and identification of victims of human rights violations that occurred during Pinochet's Dictatorship (1973-1990) and in Northern Ireland since the 1970s (2016).
15. IUGS-IFG was invited by Interpol to attend a meeting of over 200 lab managers, police officers, Interpol agents, forensic scientists and university researchers from all over the world, which was held in Interpol, Lyon, France. IUGS-IFG presented a summary of global developments in forensic geology. UNEP-INTERPOL Environmental Crimes (2016).
16. IUGS-IFG was invited to meet the new UK Police National Search adviser to discuss future collaboration with respect to the search to locate graves and other items related to homicide serious organised and counter terrorism searches for burials (2016).

D. TRAINING

1. IUGS-IFG provided training in forensic geology with the International Commission on Missing Persons (ICMP) in Bogota, Colombia. This included an introduction to forensic geology, the collection and analysis of geological trace evidence (soils, minerals, rocks and fossils) and anthropogenic materials. Training in search was provided based on the development of a conceptual geological model (CGM). Field training in Colombia included the use remote sensing, aerial photography, geomorphology and geophysics. Care was taken to avoid areas where there were suspected antipersonnel mines. A simulated grave using a pig, within the campus of the Antonio Nariño University, gave the opportunity for the search strategy and geophysical instruments to be demonstrated. Operational cases were referenced of searches for missing persons people in Colombia including the positive results obtained at a cemetery in Granada, Meta, in Colombia (2020).
2. IUGS-IFG endorsed and supported the production of a professionally produced training video on the forensic collection of soil samples, initiated by the FBI (Jodi Webb). This is aimed at raising skills levels and the standardisation of soil collection at crime scenes. The video was filmed at the University of Kentucky College of Agriculture Food and Environment, in association with Dr Brad Lee, Suzette Walling (Extension Associate) and Brian Volland (Videographer). The video is available on the link <https://youtu.be/o9dWZOj1U5A> (2020).
3. IUGS-IFG provided training at the 4th IberoAmerican Congress on Forensic Geology, in Puerto Vallarta, Mexico, in association with Reunion Anual de la Unión Geofísica Mexicana (RAUGM). The training comprised of crime scene examination and the recovery and analysis of geological trace evidence from a car. The delegates were academics, researchers and students (2019).
4. IUGS-IFG supported the Chartered Institute of Forensic Archaeologists Geophysics Group (GeoSiG) and Near Surface Geophysics group (NSGG) field exhibition, in Leicester, UK. Several geophysical techniques were demonstrated at a test site. This was followed by a postgraduate research symposium (2019).
5. IUGS-IFG contributed to a three-day European training event held in Lancashire, UK. This was organised by the University of Central Lancashire (CLAN) in conjunction with the European Network of Forensic Science Institutes (ENFSI), European Meeting on Forensic Archaeology (EMFA). It was attended by police and law enforcement from several European countries, including England, Scotland, Sweden, Germany, and the Netherlands (2019).
6. 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 (2019).

7. IUGS-IFG delivered presentations on forensic geology at the Quadrennial Conference of the International Geoscience Education Organization (IGEO) and the Brazilian Geological Congress. 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 (2018).
8. IUGS-IFG co-organised the 3rd IberoAmerican Seminar on Forensic Geology, in La Plata, Argentina. This follows on from the success of the 1st event, held in Colombia in 2009 and the 2nd event held in Brazil in 2013. More than 200 delegates attended from at least 10 countries (2017).
9. Abu Dhabi Police visited IUGS-IFG in the UK to become familiarised and updated with latest applications of forensic geology and forensic archaeology. This followed on from training delivered by IUGS-IFG in Abu Dhabi, in 2013 and 2015 (2017).
10. IUGS-IFG provided material to assist with CPD training on searches to locate burial held at the Police National Search Centre (PNSC) UK.
11. IUGS-IFG provided a series of forensic geology workshops for national forensic organisations in China (2017).
12. IUGS-IFG provided a series of forensic geology workshops for national forensic organisations in Singapore (2017).

E. KNOWLEDGE EXCHANGE AND CAPACITY BUILDING

1. The September 2020 edition of The Journal of the Geological Society of Japan, 126(8), 405-470, is dedicated to Forensic Geology. This comprises seven papers, most of which are in Japanese language. These papers include; (a) Preface and Developments in forensic geology, (b) An introduction to Forensic Geology (R. Sugita, N. Kawamura, K. Kumisaka), (c) Investigation on forensic soil analysis using quartz shapes and surface microtextures (H. Itamiya, R. Sugita, T. Sugai), (d) Short history of forensic geology in Japan (K. Kumisaka, R. Sugita), (e) The Geoforensic Search Strategy: A high assurance search method to assist law enforcement locate graves and contraband associated with homicide, counter terrorism and serious and organised crime (L. Donnelly, M. Harrison), and (f) Magnetic measurements as a forensic geology tool: a review (N. Kawamura) (2020).
2. A sub-group on forensic geology (known as the 'Student Chapter') has been established in Brazil by students to create an academic network for the development of forensic geology. This is supported and endorsed by IUGS-IFG. Further information can be found on the web site link Geoforenses.com (2020).
3. On 2 December 2020, IFG members will be contributing to a meeting hosted by the Geological Society of London (GSL) Forensic Geoscience Group (FGG), a joint two-day meeting on forensic geology, with the GSL Near Surface Geophysics Group.
4. The 1st Brazilian Geoforensic Virtual Workshop, will take on 30 November 2020 to 4 December 2020. This is supported by IUGS-IFG, the Brazilian Federal Police, Brazilian Geological Society (BGS) and the Scientific Police of Paraná. The meeting includes forensic geologists from around the world. The objective are to discuss advancements on soil forensics, forensic geophysics, environmental forensics, forensic ecology, forensic GIS, and forensic isotopes. A series of lectures and short courses will be provided with simultaneous English-Portuguese and Portuguese-English translations <https://geoforenses.com/1st-brazil-geofor-virt-workshop/> (2020).
5. On 5 to 7 October 2020, The IUGS-IFG Student Chapter organised an event to explore collaboration between academic and forensic geology investigators, Rio de Janeiro, Brazil. This included the Brazilian Federal Police, and IUGS-IFG Officer for Latin America, Fabio Augusto da Silva Salvador, and other forensic geology practitioners and a forensic biologist (2020).



6. On 21-22 September 2020, the 1st Undergraduate Geoforensic Research Workshop took place in Brazil. This was organized by the Brazilian Student Chapter of the IUGS Initiative on Forensic Geology (IFG). This focused on forensic geology research applied to policing and law enforcement and was developed by undergraduate students in Brazil. The event was opened by IUGS-IFG founder and chair, Laurance Donnelly. He congratulated the president, Marcelo Tortolero, and the students in Brazil for their success in setting up the Student Chapter. He also noted the importance of forensic geology in Brazil, led by Fabio Augusto da Silva Salvador (IUGS-IFG Co-officer for Latin America and the Brazilian Federal Police). Alastair Ruffell (IUGS-IFG Training Officer) also dialled into the event. Laurance noted the importance of the student group and the development of the next generation of forensic geologists in Brazil and Latin America. There were 117 delegates, mainly from Brazil but also Peru and Portugal. Themes included; (a) Forensic applications of sedimentological and palynological analysis of freshwater beaches in the coastal plain of Rio Grande do Sul, (b) Brazil as the main route of international narcotics trafficking: exploring soil evidence from seized cargo, (c) Potential use of palynology in car air conditioning filters as a forensic tool in Brazil and (d) analysis and characterization of soils recovered from offenders of three vehicles with forensic purposes (2020).
7. IUGS-IFG visited Warsaw, Poland, to initiate forensic geology, support a new course for undergraduates and MSc students at the University of Warsaw and provide operational advice. This included a series of presentations on; the history of forensic geology, geological trace evidence, crime scene examination, operational cases and ground searches for burials. Demonstration were also provided on the use of geophysical instruments for ground searches. IUGS-IFG collaborated with the Centralne Laboratorium Kryminalistyczne Policji (Central Forensic Laboratory of the Police). Advice was provided on forensic geology search strategies to locate Nazi death camps associated with the holocaust during the Second World War (2020).
8. IUGS-IFG have agreed to support a two year project aimed at searching for the suspected graves of missing persons in Colombia. This will include the adoption of the Geoforensic Search Strategy, developed in the United Kingdom using a blend of geological and law enforcement search techniques and strategies (2020).
9. On 5 March 2020, the first meeting on forensic geology will take place in Delhi, India, as part of the 36th International Geological Congress. This is the first formal event of its kind and will officially launch forensic geology in India (2020).
10. IUGS-IFG submitted an abstract for inclusion at the British-Finnish Natural Resources Initiative, hosted by the Geological Survey of Finland (GTK) and the British Embassy, in Helsinki. IUGS-IFG's interest included the profiling and traceability of minerals and metal through the supply chain (2020).
11. IUGS-IFG held a series of successful meeting in Bogota, Colombia, and have been invited to participate in future events and training to assist with locating missing persons and graves (2020).
12. IUGS-IFG gave a guest presentation to Rossendale and Pendle Mountain Rescue Team (RPMT), in Burnley, Lancashire, UK on, 'Forensic Geology: Searches Related to Missing Persons, Homicide Graves, Counter Terrorism and Serious and Organised Crime'. This included ideas for collaboration and future training in search and rescue (2019).
13. IUGS-IFG supported and participated in the 29th Symposium on Geo-Environments and Geo-Technics, organised by The Japanese Society of Geo-Pollution Science, Medical Geology and Urban Geology (2019).
14. IUGS-IFG visited, Incheon, Seoul, South Korea to speak at an International Police and Crime Scene Investigation (CSI) conference (2019).
15. IUGS-IFG supported and collaborated with the European Network of Forensic Science Institutes in



- The Netherlands, with regards to forensic soil science and ground search for burials (2019).
16. IUGS-IFG was represented at the European Association of Geoscientists and Engineers (EAGE), Near Surface Geophysics Workshop, in The Hague, Netherlands, the theme focussed on forensic geophysics for burials (2019).
 17. IUGS-IFG was represented at the 8th European Meeting on Forensic Archaeology European Meeting on Forensic Archaeology, held at, Moesgaard Museum, Højbjerg, Denmark. This event was arranged with the support of the Danish National Police and the European Network of Forensic Science Institutes (ENFSI) (2019).
 18. IUGS-IFG was represented at the, Silk Roads Disaster Risk Reduction and Sustainable Conference (SiDRR) and presented on the applications of Interferometric synthetic aperture radar (INSAR) and unmanned aerial vehicle UAV for disaster monitoring (2019).
 19. IUGS-IFG were invited to the Taphonomic Research in Anthropology Centre for Experimental Studies (TRACES), an animal decomposition burial research site, located in the Pennine Hills, in Burnley, Lancashire, UK (2019).
 20. IUGS-IFG was present for the opening of the ARISTA, a human taphonomy facility, at the Amsterdam Medical School in the Netherlands. This facility provides the opportunity for research in human decomposition and ground searches for buried homicide victims (2019).
 21. IUGS-IFG attended a NIST, OSAC meeting in Houston, Texas, to discuss how the Geological Materials Group of OSAC were progressing with their guidance documents on analytical methods (2019).
 22. IUGS-IFG was invited to attend the session, 'From Crime Scene to Courtroom', at the American Geophysical Union, Washington DC, USA. The objective was to highlighting a variety of methods including case studies and current practices (2018).
 23. 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 (2018).
 24. IUGS-IFG 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' (2018).
 25. 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 (2018).
 26. IFG was represented at an EBFSI, APST meeting in Pontoise, France, to produce a best practice manual for collection and analysis of soil in Euro.
 27. IUGS-IFG jointly organised with the International Association for Promoting geoethics (IAPG) a session entitled, 'Forensic Geology; Ethics, Communication, Regulation and Opportunities (RS12)', at RFG2018, in Vancouver, Canada (2018).
 28. IUGS-IFG delivered events throughout Italy on crime scene examination, and ground searches for burials (2018).
 29. IUGS-IFG 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 (2018).
 30. IUGS-IFG 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 (2018).
31. IUGS-IFG collaborated in Japan with the Japanese Society of Geo-Pollution Science, Medical Geology and Urban Geology at the, 27th Symposium on Geo-Environmental and Geo-technics, in Japan. This continues the work of developing forensic geology in Japan and reaching out to new and related fields (2017).
 32. IUGS-IFG were represented at the National Missing Persons Conference, in Sydney, Australia. The event was called, 'Missing Persons: Challenges and Opportunities' (2017).
 33. IUGS-IFG delivered a presentation at the Geological Society of America Congress (GSA2017) in Seattle, on; 'Forensic Geology: The Applications of Geology to Police and Law Enforcement'. This formed part of the series of 'Feed Your Brain' lunch time sessions organised by GSA that was for the first time simultaneous broadcasted on the internet, and attended by members of the IUGS Executive Committee (2017).
 34. IUGS-IFG supported the XXIV Brazilian Congress of Criminalistics, a natural extension and continuation of forensic geology training delivered in Brazil in previous years (2017).
 35. Initial communications took place with geologists at Cairo University interested to develop forensic geology in Egypt. This became advanced later in 2017 with discussion held at a meeting with the Geological Society of Egypt (2017).
 36. IUGS-IFG collaborated with the 6th European Meeting on Forensic Archaeology and was attended by forensic geologists, geophysicist and archaeologists, the Carabinieri, Italian Police and Ministers (2017).
 37. IUGS-IFG co-organised, chaired and presented at the Geological Society's themed event for 2017, 'Year of Risk Sharing an Uncertain World' (2017).
 38. IUGS-IFG participated in the 1st International Defence & Security Canine Conference (IDSCC) was held at the Parkinson Theatre, Royal Agricultural University, UK (2017).
 39. IUGS-IFG was represented on the ENFSI APST (Animal, Plant and Soil Traces) working group to develop European guidelines for sample handling, Budapest, Hungary (2017).
 40. IUGS-IFG presented on Geoethics in Forensic Geology, at the European Geophysical Union in Vienna, Austria (2017).
 41. IUGS-IFG supported the UK Home Office, Centre for Applied Science and Technology (CAST) and University College London, UK (2016).
 42. IUGS-IFG conducted experimental forensic geophysics was carried out in two regions of Colombian to evaluate the use of geophysical methods in the search for missing person's graves (2016)
 43. Five members of the IUGS-IFG committee attended a meeting at An Garda Síochána (the Irish Police) Headquarters, in Dublin, Ireland, to discuss ground searches for burials with the Independent Commission for the Location of Victims' Remains (ICLVR) (2016).
 44. IUGS-IFG delivered a series of multi-disciplinary presentations on forensic geology to the Institute of Geologist of Northern Ireland (IGI) and Geological Survey of Northern Ireland (GSI). It was attended by An Garda Síochána (the Irish Police) and members of the ICLVR (2016).
 45. IUGS-IFG participated in the Medicolegal Death Investigation Conference, held in Montana, USA. The target audience for this conference was Coroners, Medical Examiners, Death Investigators and other Public Safety Officers, Forensic Scientists, Physicians, Nurses, Emergency Medical Technicians, Police Officers, and others involved with the investigation of violent, suspicious, or unexpected deaths (2016).
 46. IUGS-IFG organised a session 'Forensic Soil Science and Geology' was held in collaboration with the,



5th International Conference on Criminal & Environmental Soil Forensics Soil Forensic International (SFI-2016), at the 35th International Geological Congress, Cape Town (2016).

47. IUGS-IFG delivered a forensics soil workshop for field investigators hosted by The California Association of Criminalists (CAC)/American Association of Trace Evidence Examiners (ASTEE) joint Seminar (2016).
48. IUGS-IFG designed and delivered training for the Brazilian Federal Police, along with the Federal University of Paraná, the Polícia Científica of Paraná, the National Association of Federal Criminal Consultants, and the Brazilian Association of Criminalistic. This also included the 2nd Colòquio sul Brasileiro de Pesquisas em Ciências Forenses, held at Curitiba, Paraná, Brazil and the 'VI Seminário Nacional de dna e ILboratórios Forenses, and Colóquio Sul-Brasileiro de Pesquisa em Cências Forenses. These were attended by over 500 participants (2016).

F. OUTREACH

1. IUGS-IFG held preliminary discussions to develop forensic geology in Rwanda and Central Africa countries. This will also include a focus on the use of geology to investigate and mitigate crimes that take place in the minerals and mining industry (2020).
2. IUGS-IFG was invited by the Sherlock Holmes Society of London and gave the 2019 Richard Lancelyn Green Lecture. This event was preceded by an annual dinner, held at the National Liberal Club, in Whitehall, London (2019).
3. IUGS-IFG organised a half-day outreach event on forensic geology, to senior citizens, in Chiba, Japan (2019).
4. IUGS-IFG engaged with International Commission of the Red Cross (ICRC) and African Society of Forensic Medicine (ASFM) to discuss synergies and opportunities for future collaboration and the advancement of forensic geology in Africa (2019).
5. IUGS-IFG held a two-day meeting at the Geological Society of London, Burlington House, Piccadilly, London with the Near Surface Geophysics Group of the Geological Society of London (NSGG), which held its thirteenth in a succession of biennial day meetings devoted to archaeological geophysics (2018).
6. IUGS-IFG advised on the publication of a forensic canine white paper was published on the internet and included the geological influences on canine search and detection (2018).
7. IUGS-IFG co-hosted at Queens University Belfast, Northern Ireland, the 7th European Meeting on Forensic Archaeology (2018).
8. IUGS-IFG delivered an invited lecture on forensic geology at an annual workshop of Kawasaki Geological Engineering Co., Ltd (2018).
9. IUGS-IFG gave a presentation on forensic geology to environmental and geotechnical firm in Manchester, UK (2018).
10. IUGS-IFG took part in a one day event on forensic geology that was organised by the Yorkshire Geological Society. This was held at the British Geological Survey's headquarters, in Nottingham, UK (2017).
11. IUGS-IFG gave a guest presentation on forensic geology at the Royal institution in London (2017).
12. IUGS-IFG was represented in New Mexico, USA, where a presentation was delivered on forensic geology (2017)
13. IUGS-IFG was invited to attended a dinner with the Friends of Sherlock Homes Group and subsequently became affiliated with the group, Seattle, USA (2017).

14. IUGS-IFG gave a presentation on forensic geology to the Young Professionals organisation, in Aberdeen, Scotland (2017).
15. IUGS-IFG gave a presentation on forensic geology to the Western Group of the Geological Society (2017).
16. IUGS-IFG Committee, were invited to Burlington House, the Geological Society of London Headquarters, by the Society's Publications Committee to help celebrate the Society's publications which is supported by the Episodes publication (2017).
17. IUGS-IFG was represented at the Scottish Historical Society, following an invitation from the Lord Provost of Aberdeen (2017).
18. Yorkshire Regional Group of the Geological Society of London, Leeds, UK (2016).
19. IUGS-IFG presented on forensic geology at the European Geosciences Union (EGU) General Assembly, Vienna (2016).
20. IFG gave a guest presentation on forensic geology at the Geological Society of London, East Midlands Regional Group (EMRG), at the British Geological Survey, in Keyworth, Nottingham (2016).
21. IUGS-IFG presented on forensic geology to the British Association for the Identification of Human Remains (BAHID) Conference. This included the potential contribution of geological (trace) evidence to enable the provenance and identification of human remains (2016).
22. IUGS-IFG attended the 26th Symposium on Geo-environments and Geotechnics. This was, organized by the Japanese Society of Geo-pollution Science, Medical Geology and Urban Geology, and co-organized by several other organizations including IUGS-IFG (2016).
23. IUGS-IFG attended GeoENV 2016, in Lisbon, Portugal, this conference has been held biennially at across Europe since 1966. The objective was to bring together research from hydrogeology, biology, soil sciences, air pollution or ecology and other fields, including forensic geology (soil forensics) (2016).
24. IUGS-IFG supported the 5th European Meeting on Forensic Archaeology. A presentation was given on, Geological Changes at Homicide Graves and the Influence on Search, in association with consultant forensic scientist & investigator working with the Association for the Identification of Victims Remains, the European Network of Forensic Science Institutes (ENFSI), Forensic Science Ireland (FSI) and the Geological Society of London Forensic Geoscience Group (FGG) (2016).
25. IUGS-IFG gave a keynote and several presentations at the, ANZFSS 23rd International Symposium on the Forensic Science, in Auckland, New Zealand. The conference was focussed on, 'Together Informing Justice' (2016).
26. IUGS-IFG conducted GPR experimental test work in a remote location as part of an ongoing search for a homicide grave. The GPR was able to detect and image buried targets, which were previously not detectable using other GPR equipment (2016-2018).
27. IUGS-IFG presented at the, International Seminar: Lowlands and Floodplains: Taphonomy Archaeological and Geophysics, at the Universidad de Antioquia y Tecnológico de Antioquia, Medellin, Colombia. IUGS-IFG was particularly interested in the influence of human decomposition and preservation for the use of geophysics during the search for homicide graves (2016).

G. RESEARCH

1. AAFS approved a two years long project in Colombia, which will run from 2020-2022, regarding mass graves at the Universidad Antonio of Nariño. This will be supported by IUGS-IFG in Colombia (2019-2020).



2. IUGS-IFG were provided with soil samples taken from beneath a homicide grave. These may be analysed to detect the presence of volatile organic compounds and leachate associated with human decomposition (2019).
3. IUGS-IFG held preliminary and exploratory discussion with a representative from the Forensic Anthropology Research Facility (FARF), University of Texas, with a view to conducting forensic geology test-work to investigate leachate and volatile organic compounds (VOCs), generated from human remains to assist with ground searches (2018).
4. IUGS-IFG contributed to 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 (2018).
5. IUGS-IFG supported the establishment of the Australian Facility for Taphonomic Experimental Research (AFTER), Sydney, Australia (2016-2018).
6. IUGS-IFG supported and took part in a project on Taphonomic Chemistry and Grave Detection, University of Staffordshire (2016-2017).
7. IUGS-IFG conducted research to investigate the influence of geology and hydrogeology during the deployment of forensic canines detector dogs, during the search for homicide graves and targets related to counter terrorism in collaboration with a Government Department (confidential) (2016-2020).
8. IUGS-IFG conducted research in collaboration with a PhD research project being undertaken at John Moores University in Liverpool, UK, experimental FPXRF field testing was carried out at a remote location where homicide graves were previously found (2016-2017).

H. OPERATIONAL SUPPORT OR ADVICE TO POLICE AND LAW ENFORCEMENT

1. Whilst IUGS-IFG was not specifically established to provide operation support for police and law enforcement members of the IUGS-IFG committee were invited to provide operational support for casework, including; crime scene examination, geological trace evidence and searches (water and ground), sexual crimes, environmental crimes and fraud. The details of these investigations are confidential due to their sensitive, often high profile nature or some are ongoing cases (2016-2020).
2. IUGS-IFG continued a search for a homicide grave believed by police to be buried in a remote upland location in western Europe (2016-2020).
3. IUGS-IFG provided general recommendations for a homicide case in Romania, which required a ground search for a suspected burial (2019).
4. IUGS-IFG conducted a search of a water body in Cyprus, with positive results and the recovery of a missing person. Seven victims were eventually found, one using geophysics and two remain missing (2019).
5. IUGS-IFG provided confidential advice and recommendations for a baseline geological investigation for a new forensic cemetery and human decomposition research facility (2019).
6. IUGS-IFG produced version 3.0 of an SOP on, 'Soil Sampling (Auguring) and Collection for the Detection of Volatile Organic Compounds (VOC) and Leachate Associated with Human Decomposition from a Shallow, Unmarked, Homicide Grave' (2019).
7. IUGS-IFG conducted a project to determine the potential for cross contamination for a canine training site located adjacent to a cemetery (2018).
8. IUGS-IFG provided operational support to assist the police who received information that human remains were buried at a particular location in Canada (2018).
9. IUGS-IFG have been involved in the search for graves in Colombia related to homicide and serious



organised crime (2016-2019).

10. A meeting was held with IUGS-IFG and representatives working with the Australian Federal Police and Geoforensic Specialist Search International (GSSI) (2017).
11. An IUGS-IFG committee member IUGS-IFG Use of X-ray diffraction from synchrotron X-ray sources in a cold case investigation, involving a 9 year old that went missing 33 years earlier. This information was used to help in forensic investigations in the South Australian Supreme Court to convict a person of the cold murder (2016).
12. Hillsborough Castle is an official government residence in Northern Ireland. An IUGS-IFG committee member attended a skeleton recovery inside Hillsborough Castle, UK. This was a medieval burial located by a geophysical survey, using ground penetrating radar, which detected the coffin (2016).

I. SUPPORT TO ACADEMIA AND FORENSIC GEOLOGY COURSES

1. IUGS-IFG organised a course on forensic geology, to graduate students, at the Graduate School of Science and Technology, Kumamoto University, in Kumamoto, Japan. It is the first credit course on forensic geology in Japan (2019).
2. IUGS-IFG gave a two hours guest presentation on forensic geology at Nottingham Trent University, Department of Chemistry and Forensic Science, for the MSc Course on Forensic Science, UK (2019).
3. The CAFSS transferred from CSIRO to the University of Adelaide (School of Biological Sciences), which will also facilitate succession planning for the IUGS-IFG in Australia (2019).
4. IUGS-IFG provided UK based support for a meeting that took place in Poland between the Department of Geology, University of Warsaw and the Central Forensic Laboratory. This included the establishment of a new undergraduate courses on forensic geology and help develop a search strategy to locate graves associated with the Second World War (2018-2019).
5. 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 (2018-2019).
6. IUGS-IFG delivered a presentation on forensic geology, for BSc Earth Science students, at the University of East Anglia, in Norwich, UK (2017).
7. IUGS-IFG was invited to take part in a forensic anthropology alumni careers event, with the police and a forensic consultancy at John Moores University, Liverpool, UK (2017).
8. IUGS-IFG provided technical support and presentations for a course on forensic geology, held at the University of Messina, in Sicily, Italy (2017).
9. IUGS-IFG delivered a series of knowledge transfer events were designed and delivered to BSc students and police practitioners held at Queens University Belfast, Department of Geology, Geography and Archaeology (2017).
10. IUGS-IFG provided presentations for the MSc on Forensic Geology, University of Messina, these were held in Messina and Agrigento, Sicily, Italy. The attendees comprises forensic geology students, police officers and lawyers (2016).
11. IUGS-IFG designed and delivered forensic geology field training in geological trace evidence collection and analysis, and ground searches for burials, for the MSc on Forensic Geology, University of Messina, held in Messina, Sicily, Italy (2016).
12. IUGS-IFG provided a module on, 'Geoforensics' for the University of Leicester, Department of Geology. This followed on from a series of past forensic geology lectures provided for BSc (Hons) Geology students (2016).

13. IUGS-IFG agreed to support the Universities of Camerino and Verona in Italy, for a proposed postgraduate master courses in forensic geology. However, this was cancelled due to an earthquake which damaged buildings (2016).

J. MINING, MINERALS AND METALS

1. IUGS-IFG conducted research to manage theft, adulteration and substitution of base metal mineral concentrates, precious metals, smelter and refinery products takes place throughout the world, in particularly in Mexico, South America, Africa and Asia. Following successful laboratory trials, IUGS-IFG proposes to introduce microtaggants into mineral products to aid tracking and verification of a mineral cargo's authenticity and identification. This may potential compliment conventional mineralogical profiling techniques (2019-2020).
2. IUGS-IFG attended meetings in the Democratic Republic of Congo to better understand crimes that take place in minerals and mining and how these may be geologically investigated (2019).
3. IUGS-IFG arranged a meeting in Mexico to consider geological methods to manage and mitigate criminal activities associated with mineral, mining and meals. This includes conflict minerals, sample adulteration, substitution and the theft of metals and refinery products (2019).
4. IUGS-IFG attended a meeting in Zambia, with representatives from Zambia and South Africa. This included geological methods to investigate, manage and mitigate fraud and corruption in the mining and minerals industry, including theft and the adulteration or substitution of mineral concentrates and precious metals (2019).
5. IUGS-IFG attended meetings in the UK that included geological methods for the mitigation of risks associated with ore and mineral concentrate fraud, theft, substitution and adulteration (2019).
6. IUGS-IFG attended a meeting in Santiago, Chile, with representatives from Chile, Bolivia, Peru, Mexico and Bolivia. This included geological methods to investigate, manage and mitigate fraud and corruption in the mining and minerals industry, including theft and the adulteration or substitution of mineral concentrates and precious metals (2019).
7. IUGS-IFG visited Colombia to assist with the establishment of a national gold fingerprinting program, with the National University of Colombia, the Geological Survey of Colombia and the Ministry of Mines to address the problem of illegal gold mining in Colombia (2018-2019).
8. IUGS-IFG was be 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 (2018).
9. IUGS-IFG gave a presentation for the South West Regional Group (SWRG) of the Geological Society of London, at the University of Bristol, Department of Geology, on substitution cases, mining scams, fake fossils, hydrocarbon, archaeology (Pitldown Man and the Bosnian Pyramids), art fraud and historic fraud (2016).

K. FORENSIC GEOLOGY AND WAR GRAVES

1. IUGS-IFG gave advice for the use of geophysical methods and a search strategy to locate suspected war graves in Poland from the Second World War (2020)
2. IUGS-IFG provided UK based advice for searches aimed at locating mass graves in Lithuania. These were believed to be related to the Holocaust in Second World War, with at least one grave was related to the Soviet occupation (2019).
3. IUGS-IFG provided general advice for a mass grave whereby others mapped the location of an escape tunnel at the Ponary mass execution site, where up to 100,000 people (mostly Jews, and a number of communists and political dissidents) were executed by Nazi and Lithuanian death squads (2018).



L. GEOFRENSIC INTERNATIONAL NETWORK (GIN)

1. GIN brings together forensic geologists, geoscientists, police and law enforcement officers from around the world to develop and promote forensic geology. The countries now represented in GIN include; Australia, Argentina, Belize, Belgium, Bolivia, Brasil, Canada, China, Chile, Colombia, Democratic Republic of Congo (DRC), Denmark, Ecuador, Egypt, England, France, Finland, Germany, Hungary, India, Iran, Ireland, Israel, Italy, Japan, Malta, Mexico, Namibia, Netherlands, New Zealand, Nigeria, Northern Ireland, Poland, Portugal, Russia, Scotland, South Africa, South Korea, Singapore, Spain, Sweden, Switzerland, Taiwan, Netherlands, United Arab Emirates, Vietnam, United States of America, Wales and the West Indies (Caribbean) and Zambia (2016-2020).
2. Targeted countries for 2020 and beyond and potential membership are; Belarus, Kazakhstan, Kyrgyzstan, Kuwait, Mongolia, Oman, Qatar, South and Central American Counties, Malaysia and African Countries.

M. SPECIAL PROJECT ON CRIMES IN MINERALS, MINING AND METALS

1. The Initiative on Forensic Geology (IFG) was awarded from IUGS a 'Special Project', and will focus on the 'Forensic Geological Analysis of Crimes in International Mining, Minerals and Metals'. Civilisation could not exist, as we know it, without the minerals upon which it relies. However, there is a global growing crime problem. Mining-related crime includes, but is not restricted to: (i) illegal mining beyond regulatory control, (ii) fraud, (iii) theft, (iii) adulteration of mineral concentrates or processed metals, (iv) the substitution of samples ahead of assaying, (v) the mining and trading of conflict minerals, (vi) mineral smuggling and (vii) fakery. The scale of such criminal activity is at present poorly documented, but is suspected to take place around the world and is linked to serious and organised crime cartels, terrorist organisations and some political regimes. As a result, mining crime, can directly or indirectly affect many parts of society. The project will last for two years and aims to report its findings in 'Episodes' (2020).

N. WEB SITE

1. IFG commissioned the upgrade of the IFG web site. A new web site will be hosted by Queens University Belfast and is expected to become operational in 2020 or early 2021 (2020).

O. IFG AWARD

1. The IFG Committee awarded Maureen Bottrell, FBI forensic geologist and forensic examiner, as the first recipient of the 'IFG Raymond Murray Award for Recognised and Distinguished International Contributions to Forensic Geology' (2020).
2. The IFG Committee awarded Dr Carlos Molina the 'IFG Award for Recognised and Distinguished International Contributions to Forensic Geology' (2019).
3. The IFG Committee awarded Prof Robert Fitzpatrick the 'IFG Award for Recognised and Distinguished International Contributions to Forensic Geology' (2016).

P. PENDING PUBLICATIONS

In 2019, the final manuscript for, '*A Guide to Forensic Geology*' was submitted to the Geological Society of London, the publication is expected in 2020. The editors of the publication are Laurance Donnelly, Duncan Pirrie, Mark Harrison, Alastair Ruffell and Lorna Dawson. The contents are as follows:

- Acknowledgements
- List of Abbreviations and Acronyms
- Preface (Laurance Donnelly)
- Chapter 1: Introduction (Laurance Donnelly)
- Chapter 2: A Historical Overview of Forensic Geology (Laurance Donnelly, Raymond Murray)

- Chapter 3: Geoforensic Search Strategy (GSS): Ground Searches Related to Homicide Graves, Counter Terrorism and Serious and Organised Crime (Laurance Donnelly, Mark Harrison)
- Chapter 4: Crime Scenes: Geoforensic Assessment, Sampling and Examination (Duncan Pirrie, Alastair Ruffell, Lorna Dawson, Jennifer McKinley)
- Chapter 5: Geological Evidence Recovery from Exhibits (Duncan Pirrie, Alastair Ruffell, Lorna Dawson)
- Chapter 6: Geological Evidence Analysis (Alastair Ruffell, Duncan Pirrie, Lorna Dawson)
- Chapter 7: The Judicial System, Reporting and Giving Evidence in Court (Lorna Dawson, Derek Auchie, David Parratt)
- Chapter 8: Emerging Applications of Forensic Geology (Laurance Donnelly, Alastair Ruffell)
- References

In 2020, the final draft of, *'Forensic Soil Science and Geology'* is expected to be submitted to the Geological Society of London. Publication is expected to be in 2021, as a *'Special Publication'* series. Some of the papers are available online at the following link: <https://sp.lyellcollection.org/online-first/492>

- The application of forensic geology to investigate the substitution of zinc ingots between China and Brazil
Fábio Augusto da Silva Salvador, Matheus Pereira Nogueira e Silva, Ricardo de Oliveira Mascarenhas and Anelize Manuela Bahniuk Rumbelsperger)
Geological Society, London, Special Publications, 492, 4 November 2019
<https://doi.org/10.1144/SP492-2018-83>
- Analysis of soil following a police-led open area search and the recovery of a cold-case homicide grave
L. J. Donnelly, J. Cassella, D. Pirrie, L. Dawson, G. Blom, A. Davidson, P. Arnold, M. Harrison and C. Hope
Geological Society, London, Special Publications, 492, 29 October 2019
<https://doi.org/10.1144/SP492-2017-337>
- Automated mineralogical profiling of soils as an indicator of local bedrock lithology: a tool for predictive forensic geolocation
Duncan Pirrie, Daniel E. Crean, Allan J. Pidduck, Timothy M. Nicholls, Roy P. Awbery and Robin K. Shail
Geological Society, London, Special Publications, 492, 25 October 2019
<https://doi.org/10.1144/SP492-2019-42>
- The forensic comparison of trace amounts of soil on a pyjama top with hypersulphidic subaqueous soil from a river as evidence in a homicide cold case
Robert W. Fitzpatrick and Mark D. Raven
Geological Society, London, Special Publications, 492, 28 August 2019,
<https://doi.org/10.1144/SP492-2019-59>
- Trace evidence examination using laboratory and synchrotron X-ray diffraction techniques
Mark D. Raven, Robert W. Fitzpatrick and Peter G. Self
Geological Society, London, Special Publications, 492, 28 August 2019
<https://doi.org/10.1144/SP492-2019-36>
- Evaluation of forensic soil traces from a crime scene: robbery of a safety deposit box in Brazil
S. A. Testoni, V. F. Melo, L. A. Dawson, F. A. S. Salvador and L. V. Prandel
Geological Society, London, Special Publications, 492, 28 August 2019
<https://doi.org/10.1144/SP492-2019-35>

- Comparison of geophysical and botanical results in simulated clandestine graves in rural and tropical environments in Colombia, South America
Carlos Martin Molina and Jamie K. Pringle
Geological Society, London, Special Publications, 492, 22 August 2019
<https://doi.org/10.1144/SP492-2017-290>
- The forensic application of ground-penetrating radar, Tekoha Jevy indigenous village, Paraná, Brazil
Rafael E. Canata, Fábio A. S. Salvador, Welitom R. Borges, Francisco J. F. Ferreira, Eduardo X. Seimetz, Ivan Pinto and Eduardo O. Barros
Geological Society, London, Special Publications, 492, 22 August 2019,
<https://doi.org/10.1144/SP492-2017-329>
- A case study in forensic soil examination from China
Hongling Guo, Ping Wang, Can Hu, Jun Zhu, XueYing Yang, Yangke Quan, HongCheng Mei and JinFeng Li
Geological Society, London, Special Publications, 492, 30 July 2019
<https://doi.org/10.1144/SP492-2017-307>
- The importance of forensic soil science and geology being connected to mainstream forensic science
Hilton Kobus and James Robertson
Geological Society, London, Special Publications, 492, 30 July 2019,
<https://doi.org/10.1144/SP492-2017-314>
- Dealing with different forensic targets: geoscientists at crime scenes
P. M. Barone and R. M. Di Maggio
Geological Society, London, Special Publications, 492, 23 July 2019
<https://doi.org/10.1144/SP492-2017-274>
- Plant wax compounds and soil microbial DNA profiles to ascertain urban land use type
L. A. Dawson, L. M. Macdonald and K. Ritz
Geological Society, London, Special Publications, 492, 17 July 2019
<https://doi.org/10.1144/SP492-2018-65>
- Portable X-ray fluorescence (PXRF) spectrometry of earth materials: considerations for forensic analysis
Elisa Bergslien
Geological Society, London, Special Publications, 492, 11 July 2019
<https://doi.org/10.1144/SP492-2017-346>
- The desktop study – an essential element of geoforensic search: homicide and environmental cases (west Belfast, Northern Ireland, UK)
Alastair Ruffell and Lorraine Barry
Geological Society, London, Special Publications, 492, 11 July 2019
<https://doi.org/10.1144/SP492-2017-333>
- Geoforensics in Italy: education and research standards
R. M. Di Maggio and P. M. Barone
Geological Society, London, Special Publications, 492, 9 July 2019

<https://doi.org/10.1144/SP492-2017-273>

- Soil DNA: advances in DNA technology offers a powerful new tool for forensic science
Jennifer M. Young, Denice Higgins and Jeremy J. Austin
Geological Society, London, Special Publications, 492, 4 July 2019
<https://doi.org/10.1144/SP492-2017-351>
- Geographical Information Science (GIS), spatial sampling and sediment variability examined using a case of manslaughter
Jennifer McKinley and Alastair Ruffell
Geological Society, London, Special Publications, 492, 17 June 2019
<https://doi.org/10.1144/SP492-2018-16>
- Identifying the source of illicit gold from South America
Roger D. Dixon and Roland K. W. Merkle
Geological Society, London, Special Publications, 492, 14 June 2019
<https://doi.org/10.1144/SP492-2018-15>

Q. KEY PUBLICATIONS AND NOTEWORTHY PRODUCTS

- In 2020, The Journal of the Geological Society of Japan, 126(8), 405-470, September 2020, was dedicated to Forensic Geology.
- In 2020, IUGS-IFG produced a booklet of abstracts for the 4th Iberoamerican Seminar on Forensic Geology, which was held in Puerto Vallarta, Mexico, in October 2019. This took place in association with; Reunion Annual de la Unión Geofísica Mexicana (RAUGM); Universidad Antonio Nariño (Colombia); the Brazilian Federal Police and Forensic Geoscience (Italy). The booklet is available from Dr Laurance Donnelly (IUGS-IFG Chair) (geologist@hotmail.co.uk) and Prof Carlos Martin Molina Gallego (IUGS-IFG Officer for Latin America) (martin.molina@uan.edu.co)
- In 2019, IFG supported a FBI led training video on the collection of soil for the provision of geological trace evidence, available on YouTube. This video now included sub-titles in Mandarin and will be uploaded onto the IUGS-IFG new web site, when completed. The translation was completed by Prof Guo Hongling (IFG Officer for China) and Wangping, Institute of Forensic Science, Ministry of Public Security, in China.
<https://youtu.be/o9dWZOj1U5A>
- IUGS-IFG endorsed and supported the production of a professionally produced training video on the forensic collection of soil samples, initiated by the FBI. This is aimed at raising skills levels and the standardisation of soil collection at crime scenes. The video was filmed at the University of Kentucky College of Agriculture Food and Environment, and was posted on the University of Kentucky YouTube channel.
<https://youtu.be/o9dWZOj1U5A>
- An article was published by IUGS-IFG committee members on, 'Solving Crimes with Geology', in Engineering and Technology.
<https://EandTmagazine.com>
- Brazilian Federal Police created the first online site on Forensic Geology in Brazil
<https://geoforenses.com>
- Calvo, J.P. 2016. International Union of Geological Sciences (IUGS) Ad Hoc Review of Initiative on Forensic Geology (IFG). Episodes Vol. 39, no. 3, 535-537.



- Dawson, L.A. & Gannicliffe, C. (2017) Managing the myths, the CSI effect in forensic science. November issue of Microbiology Today, 2017.
<https://microbiologysociety.org/publication/current-issue/microbiology-in-popular-culture/article/managing-the-myths-the-csi-effect-in-forensic-science.html>
- Dawson, L.A. (2019) Contribution to the European Network of Forensic Science Institutes (ENFSI) and the Animal Plant Soil Trace (APST) Working Group, European Best Practice Manual.
- Dawson, L.A. 2016. Invited article in the LKA (State office of criminal investigations in state of Rheinland-Pfalz) - Kriminalpolizei.
- Dawson, L.A. 2016. Forensic geology: a review, 2013-2016. Interpol review of International Forensic Science. Published by INTERPOL, Confidential document. September 2016.
- Demaneche, S., Schauer L, Dawson LA, Franqueville L, Simonet P. 2017. Microbial soil community analyses for forensic science: Application to a blind test. Forensic Science International, 270: 153–158.
- Donnelly, L. J. 2017. Special Guest Editor. Forensic Geology Themed Issued. Episodes. Journal of the International Union of Geological Sciences, June 2017.
- Donnelly, L. J. 2017. Introduction: The Episodes Themed Issue on Forensic Geology and the IUGS Initiative on Forensic Geology. In; Donnelly 2017 (Guest Editor). Forensic Geology Themed Issued. Episodes. Journal of the International Union of Geological Sciences, June 2017, 96-105.
- Donnelly, L. J. and Harrison, M. 2017. Ground Searches for Graves and Buried Targets Related to Homicide, Terrorism and Organised Crime. In; Donnelly, L. J. (Guest Editor) 2017. Forensic Geology Themed Issued. Episodes. Journal of the International Union of Geological Sciences, June 2017, 106-117.
- Donnelly, L. J. 2017. International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG). Chairs Annual Report for 2016.
- Donnelly, L. J. and Ruffell, A. 2017. The Geological Society of London (GSL), Forensic Geoscience Group (FGG): The First Decade, 2006-2016. Geoscientist. Volume 26, Number 11, December 2016/January 2017, 10-15. <https://www.geolsoc.org.uk/Geoscientist/DecemberJanuary-2016-17/Forensic-Geoscience-Group-the-first-decade>
- Donnelly, L. J., Dawson, L., Ruffell, A., McKinley, J., Di Maggio, R. M., Harrison, M. 2017. Forensic Geology and Geoethics. EGU General Assembly, Session EOS14 Geoethics; ethical , social, cultural implications of geosciences knowledge, education, research and practice, 23-28 April 2017, Vienna, Austria (poster).
- Donnelly, L. J., Dawson, L., Ruffell, A., McKinley, J., Di Maggio, R. M., Harrison, M. 2017. Geoethics and Forensic Geology and Geoethics. EGU General Assembly, Session EOS14 Geoethics; ethical , social, cultural implications of geosciences knowledge, education, research and practice, 23-28 April 2017, Vienna, Austria (abstract).
- Donnelly, L. J. 2017. Communicating Geoscience Risk. Sharing and Uncertain World: Lessons in Managing Risk. Year of Risk 2017. The Geological Society of London, Burlington House, Abstract Booklet, p13.
- Donnelly, L. J. 2017. Forensic Geology Front Line Operation Services for Police and Law Enforcement Investigations and the Evaluation of Associated Risks. Sharing and Uncertain World: Lessons in Managing Risk. Year of Risk 2017. The Geological Society of London, Burlington House, Abstract Booklet, p38-38.
- Donnelly, L. J. 2017. Forensic Geology: The Applications of Geology to Police and Law Enforcement.



Geological Society of America, Annual Meeting, Lunchtime Enlightenment, Feed Your Brain, Washington Convention Centre, Ballroom 6A, Seattle, USA, Wednesday 25 October 2017.

- Donnelly, L. J. 2016. Geological Society of London (GSL), Forensic Geoscience Group (FGG); the first 10 years and the International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG); the first 5 years. 35th International geological Congress, Cape Town, 29 August 2016, T6.1 - Forensic Soil Science and Geology.
- Donnelly, L. J. and Ruffell, A. 2017. The Geological Society of London (GSL), Forensic Geoscience Group (FGG): The First Decade, 2006-2016. *Geoscientist*. Volume 26, Number 11, December 2016/January 2017, 10-15. <https://www.geolsoc.org.uk/Geoscientist/DecemberJanuary-2016-17/Forensic-Geoscience-Group-the-first-decade>
- Donnelly, L. J. 2017. Special Guest Editor. Forensic Geology Themed Issued. Episodes. *Journal of the International Union of Geological Sciences*, June 2017.
- Donnelly, L.J., Cassella, J., Pirrie, D., Dawson, L., Harrault, L., Blom, G., Davidson, A., Arnold, P., Harrison, M and Ruffell, A. 2016. Analysis of leachate, VOCs, fatty acids and mineralogy following the discovery of a homicide grave: Potential implications for police led open area ground searches for burials. 35th International Geological Congress, Cape Town, 29 August 2016, T6.1 - Forensic Soil Science and Geology.
- Di Maggio, R.M. & Barone, P.M. 2017. *Geoscientist at Crime Scenes*. Springer.
- Di Maggio, R. M., Donnelly, L.J., Al Naimi, K. S., Barone, P. M., Salvador, F. A. D. S., Dawson, L., Dixon, R., Fitzpatrick, R., Gradusova, O., Nesterina, E., Peleneva, M., Ushacova, O., Galego, C. M. M., Pirrie, D., Ruffell, A., McKinley, J., Schneck, B., Sagripanti, D., Villalba, D., Sugita, R., Wach, G., Silva, R. & Forbes, S. 2017. Global Developments in Forensic Geology. In; Donnelly, L. J. (Guest Editor) 2017. Forensic Geology Themed Issued. Episodes. *Journal of the International Union of Geological Sciences*, June 2017, 120-131.
- Dixon, R and Schouwstra, R 2017. The role of forensic geology in the illicit precious metals trade. Episodes, 40:132-140.
- Di Maggio, R. M., Langella, Al., Mercurio, M., Cappelletti, P. (2019). 'Analisi Mineralogiche in Ambito Forense' (Mineralogical Analysis Applied to Forensics). Aracne, Italia.
- Forbes, S.L., Troobnikoff, A.N., Ueland, M., Nizio, K.D. and Perrault, K.A. Profiling the decomposition odour at the grave surface before and after probing. *Forensic Science International*. 259: 193-199, 2016.
- Grime, M. 2018. Forensic canine white papers. A proof of concept foundational guide to the application of forensic canines within law enforcement investigations, research and training development. Burial Research Group, Forensic Canine Research and Development Group. School of Law, Policing and Forensics, Staffordshire University.
<http://eprints.staffs.ac.uk/4750/1/Forensic%20Canine%20Foundation%20.pdf>
- House of Lords Inquiry into Forensic Science:
<https://www.parliament.uk/business/committees/committees-a-z/lords-select/science-and-technology-committee/inquiries/parliament-2017/forensic-science/forensic-science-publications/>
<https://www.parliament.uk/business/committees/committees-a-z/lords-select/science-and-technology-committee/>
<https://www.ruth-morgan.com/blog/house-of-lords-science-and-technology-committee-inquiry>
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786137/FSRAnnual_Report_2018_v1.0.pdf

- McCulloch, G.; Dawson, L.A.; Brewer, M.J.; Morgan, R. 2017. The identification of markers for Geoforensic HPLC profiling at close proximity sites., *Forensic Science International*, 272, 127-141
 - Miller, D.R.; Dawson, L.A.; Morrice, J.; McKeen, M.; Donnelly, D. 2016. Report on prototype spatial geoforensic database. EU Project MiSAFE, Deliverable 5.8, Report to the European Commission, EU FP7 MISAFE Project, 313149.
 - Molina, C. 2017. 3rd IberoAmerican Seminar on Forensic Geology, held in La Plata, Argentina (abstracts).
 - Molina, C.M., Pringle, J.K., Saumett, M. and Evans, G.T. 2016. Geophysical and botanical monitoring of simulated graves in a tropical rainforest, Colombia, South America. *Journal of Applied Geophysics*. 135, 232–242.
 - Molina, C.M., Pringle, J.K., Saumett, M. and Evans, G.T. 2016. Geophysical monitoring of simulated graves with resistivity, magnetic susceptibility, conductivity and GPR in Colombia, South America. *Journal of Applied Geophysics*. 261, 106–115.
- Murray, Kathleen R, Fitzpatrick Robert W, Bottrill Ralph S, Berry Ron, Kobus Hilton. 2016. Soil transference patterns on bras: Image processing and laboratory dragging experiments. *Forensic Science International*. 258, 88-100. <http://dx.doi.org/10.1016/j.forsciint.2015.10.009>.
- Ruffell, A., Donnelly L.J., Knupfer, G.C. 2016. Successes and Failures in Detecting Buried Non-metallic Objects Using Ground (and Water) Penetrating Radar (WPR and GPR). 35th International geological Congress, Cape Town, 29 August 2016, T6.1 - Forensic Soil Science and Geology.
 - Shand, C.A.; Wendler, R.; Dawson, L.A.; Yates, K.; Stephenson, H. 2017. Multivariate analysis of Scotch whisky by total reflection x-ray fluorescence and chemometric methods: a potential tool in the identification of counterfeits., *Analytica Chimica Acta*, 976, 14-24.

R. MEDIA, FILM AND TELEVISION

- IUGS-IFG was approached to consider a TV Documentary on forensic geology in the UK (2020).
- IUGS-IFG Officer for Pacific gave two interview for CBC regarding the first body farm (human decomposition research facility) in Canada (2019).
- IUGS-IFG met a freelance photojournalist to discuss the production of an article to help promote forensic geology in a major UK national newspaper (2019).
- IUGS-IFG gave an interview to BBC Radio Lancashire, in the UK. The items discussed included the background and objectives of IUGS-IFG and how forensic geology may be used by police and law enforcement to locate graves and other burials (2019).
- 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. This includes the use of geological mapping, satellite imagery, photogrammetry and geophysics to the in the search for graves (2018). Further details can be found at: <https://www.dw.com/en/truth-detectives-2/av-44554549>
- IUGS-IFG gave an interview, 'The Soil Detective'. *Readers Digest*. July 2017. 59-70.
- IUGS-IFG gave an interview to The Metro. '10 living female scientists you should know about'. Metro.co.uk/2017/05/24
- IUGS-IFG gave an interview, 'Soil Detectives'. *The One Show*. BBC TV. 9 March 2017.
- IUGS-IFG gave an interview, 'Brainwaves' Radio interview. Radio Scotland and podcasts. 5 April, 2017.



- IUGS-IFG gave an interview for the Royal Society of Edinburgh. Interviews for Quiz a Whiz. Soil Science, 7 April, 2017.
- IUGS-IFG gave a live internet broadcast, Geological Society of America Congress (GSA2017) in Seattle, presentation on 'Forensic Geology: The Applications of Geology to Police and Law Enforcement' (2017).
- IUGS-IFG gave an interview on the Italian TV Channel, Tele Roma Uno, with a geophysicists from the American University of Rome. This was for the TV program 'Missing', where the efforts of IUGS-IFG was explained including the developing forensic geology and its best practice (2016).
- IUGS-IFG contributed to Lin Andersons recent novel, 'None but the Dead' (as a forensic geoscientist) and to advise on BBCs TV programme, 'Silent Witness' (2016)
- IUGS-IFG gave an interview, 'Soil as evidence in r v Halliwell'. Swindon Advertiser, 12 September 2016.
- IUGS-IFG gave an interview, 'Soils of the crofts'. The James Hutton Institute Publication with Crofting Connections, Aberdeen, 2nd ed., 57pp.
- IUGS-IFG gave an interview, 'The answer to crime riddles answers lies in the soil'. Sunday Express and Scottish Sunday Express, 4 September 2016.
- IUGS-IFG gave an interview for BBC Wiltshire / BBC West Radio, 20 September 2016.
- IUGS-IFG gave an interview for Public Video Presentation, Royal Society of Edinburgh Whiz a Quiz, Edinburgh, 29 August 2016.
- IUGS-IFG gave an interview on event to be held in Byres Road Glasgow. Sunday Telegraph, 4th September 2016.
- IUGS-IFG gave an interview, 'Temporal fatty acid profiles of human decomposition fluids in soils' <http://www.bbc.co.uk/news/uk-scotland-37561722> Authors: Suzanne Allan. [BBC Online Web Site Article.](#)
- IUGS-IFG gave an interview for radio by Fiona Stalker, BBC Radio Scotland.
- IUGS-IFG gave an interview, 'Project on soil provenance and feature on soil forensics', for The One Show. Interview for BBC the One Show.
- IUGS-IFG gave an interview, 'None but the dead; forensic fact meets crime fiction'. Byres Road Book Festival, Glasgow.
- IUGS-IFG gave an interview, 'The use of soil in the criminal justice system'. Soils: Environment, Health and Society - A Summary Booklet of Research Highlights from the RESAS Work Programme 2011-2016, Chapter 8.
- IUGS-IFG gave an interview by Viviane Richter. Synchrotron helps clear up cold case file. Cosmos Magazine. News Technology. <https://cosmosmagazine.com/technology/synchrotron-helps-clear-cold-case-file>
- IUGS-IFG gave an interview by Mark Dunn. Hi-tech crime fight: Synchrotron cracks cold cases. Herald Sun. News page
- IUGS-IFG gave a lecturer and was a panellist on "CSI Adelaide" at the Research Tuesday Public Lecture. Making soil talk: The value of soil in solving criminal investigations. <http://blogs.adelaide.edu.au/researchtuesdays/2016/02/29/csi-adelaide/>
- IUGS-IFG gave a lecturer and was a panellist Lecturer & panellist on "Forensics in Adelaide" at Science in the pub. Making soil talk: The value of soil in solving criminal investigations.



<http://scienceinthepubadelaide.org.au/SciPub-events.html>

- IUGS-IFG gave an interview for University College London: <https://blogs.ucl.ac.uk/forensic-sciences/cfs-seminar-series-mike-ferguson-cast/>
- IUGS-IFG gave an interview on Art Forgeries: https://en.wikipedia.org/wiki/Shawn_Greenhalgh

Other media web sites involving IUGS_IFG are as follows:

- <http://comunicatistampa.unime.it/2016/02/15/al-via-la-ii-edizione-del-master-universitario-di-i-livello-in-geologia-forense/print/>
- <http://comunicatistampa.unime.it/2016/02/15/al-via-la-ii-edizione-del-master-universitario-di-i-livello-in-geologia-forense/print/>
- <http://www.unime.it/dipartimenti/biomorf/ bandi e concorsi studenti/master di i livello in geologia forense ii ediz a a 2015 2016-45267.html>
- <http://web.unime.it/unigeolab/ pagine/-15696.html>
<https://www.facebook.com/mastergeologiaforense/>
- <http://www.agenda.unict.it/11362-geologia-forense.htm>
- <https://www.eventbrite.ie/e/forensic-geology-applications-to-crime-police-law-enforcement-tickets-25316329824>
- <https://www.westpark.co.uk/conference-centre>
- <http://www.abc.net.au/news/2016-10-18/australia-s-only-body-farm-helping-crime-scene-investigators/7939664>
- <http://www.nationalgeographic.com.au/science/australias-first-body-farm-flooded-with-donations.aspx>
- <http://www.abc.net.au/classic/content/2016/09/28/4542014.htm>
- <https://www.pressreader.com/australia/the-australian-womens-weekly/20160801/281590944874962>
- <https://www.newscientist.com/article/mg23030760-600-life-amid-death-at-australias-new-body-farm/>
- <http://www.abc.net.au/news/2016-03-07/selling-the-idea-of-a-body-farm-to-illawarra-seniors/7226248>
- <https://www.odt.co.nz/news/dunedin/forensic-scientist-shares-insights>
- <http://www.pbs.org/wgbh/nova/next/military/vilnius-tunnel/>
- http://www.nytimes.com/2016/06/29/science/holocaust-ponar-tunnel-lithuania.html?_r=0
- <https://www.theguardian.com/world/2016/jun/29/researchers-map-wartime-escape-tunnel-in-lithuanian-forest>
- <http://news.nationalpost.com/news/canada/a-canadian-pinpointed-the-secret-tunnel-nazi-prisoners-dug-to-escape-the-holocaust-in-lithuania>
- <http://calgaryherald.com/news/local-news/calgary-geophysicists-help-uncover-world-war-ii-escape-tunnel>

For further information

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



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