



**INTERNATIONAL UNION OF GEOLOGICAL SCIENCES  
INITIATIVE ON FORENSIC GEOLOGY  
ELECTRONIC NEWSLETTER**



*Official Electronic Newsletter of the International Union of Geological Sciences, Initiative on Forensic Geology*

The International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG), was officially launched during the 62nd Executive Committee Meeting of the IUGS, which was held at UNESCO headquarters, in Paris, France, on 22nd February 2011. The objectives of the IUGS-IFG are to:

- Collate and disseminate data and information on forensic geology applied to policing and law enforcement, criminal, environmental and civil investigations;
- Promote international meetings, seminars, conferences and training;
- Develop a 'Committee' to act as principal advisers, collaborators and active participants;
- 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;
- Collate, make available and where appropriate review any existing documentation and publications in forensic geology; and
- Produce a document endorsed by the Committee to be called; 'A Guide to Forensic Geology'.



*IUGS-IFG Committee at the Annual General Meeting and Strategy Meeting, Geological Society of London, Burlington House, London, 4<sup>th</sup>-5<sup>th</sup> December 2014 (photo Skip Palenik)*

#### **IUGS-IFG COMMITTEE**

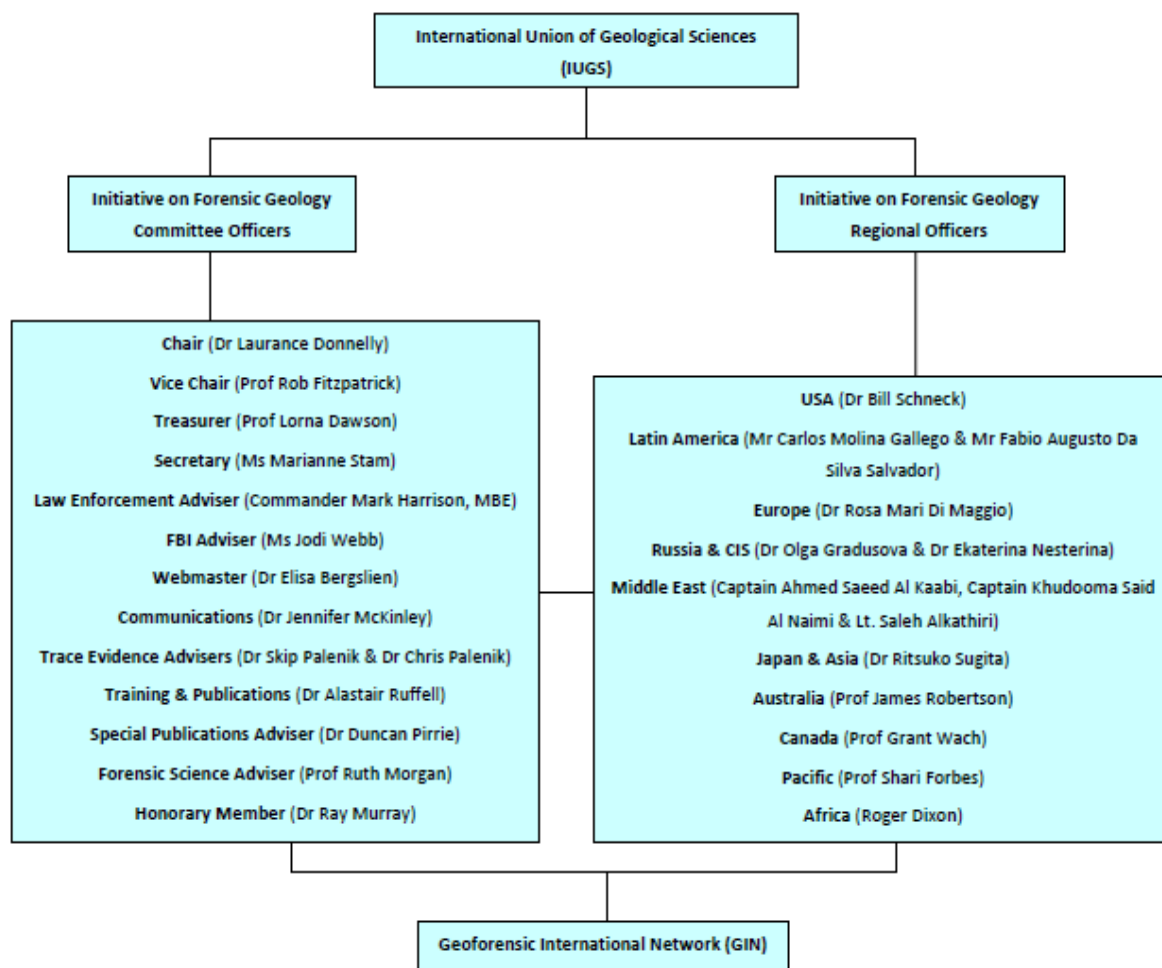
The IUGS-IFG Committee comprises representatives from major geographical regions of the world and includes specialists from academia, industry, consultancy, operationally based forensic geologists, the police, law enforcement agencies and forensic organisations. In 2015, three new members were assigned to the IUGS-IFG Committee: Dr Duncan Pirrie, Special Publications Adviser; Dr Ruth Morgan, Forensic Science Adviser and Mr Fabio Augusto Da Silva Salvador, joint Co-officer for Latin America

#### **IUGS-IFG GEOFORENSIC INTERNATIONAL NETWORK (GIN)**

The Geoforensic International Network (GIN) brings together forensic geologists, geoscientists and invited police/law enforcement officers from around the world, who have a desire and interest in the development of forensic geology. New contacts have been provided for potential members in; Belarus, China, Kazakhstan, Kyrgyzstan, Kuwait, Mongolia, Oman, Qatar, Poland and Venezuela. Countries now represented in GIN include;



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



*IUGS-IFG Committee*

**2015 EVENTS & ACTIVITIES**

During 2015, IUGS-IFG contributed to and completed the following capacity building, technology transfer and outreach events, which are summarised below in chronological order:

**IUGS 68th Executive Committee Meeting, Vancouver, Canada, January 2015**

On 27th January 2015, Grant Wach attended the 68<sup>th</sup> IUGS Executive Committee meeting in Vancouver and provided an overview of IUGS-IFG activities throughout 2014. The global progression of Forensic Geology was acknowledged and positive feedback was provided. Jose Calvo, Secretary General of IUGS, on behalf of the Bureau of the International Union of Geological Sciences.

**Search for a Grave, Northern England**

Throughout 2015, Laurance Donnelly continued the search for a grave with the support of IUGS-IFG committee members. This included a reconnaissance field visit to the search area and workshop held on 6<sup>th</sup> November 2015, attended by Duncan Pirrie, Alastair Ruffell and Lorna Dawson. The results of the search were shared with other IUGS-IFG committee members in Australia, UAE, Colombia and USA.

**The Royal Society, London, England, February 2015**

On 2<sup>nd</sup> to 3<sup>rd</sup> February 2015, Lorna Dawson, Jennifer McKinley and Alastair Ruffell attended, 'The Paradigm Shift in Forensic Science', which was held at The Royal Society in London, organised by Professors Niamh ni Mchdaid and Sue Black.





Laurance Donnelly and Lorna Dawson assist with a ground search (photo: Laurance Donnelly)

#### Forensic Geology at the ICE & CIWEM Annual Dinner, Cardiff, Wales, February 2015

On 5th February 2015, Laurance Donnelly was invited as guest speaker at the Annual Dinner of the Institution of Civil Engineers (ICE) and Chartered Institution of Water and Environmental Management (CIWEM). The presentation given was entitled: 'Forensic Geology: The Applications of Geology to Policing and Law Enforcement'. The event was attended mainly by civil and structural engineers and students. It was held at the Trevithick Lecture Theatre at the Cardiff School of Engineering. There was particular interest in the applications of Forensic Geology to civil engineering failures.

#### Forensic Science Seminar, University College London (UCL), England, February 2015

On 5th February 2015, Mike Ferguson (CAST & GIN member) gave a presentation at UCL, organised by Ruth Morgan. Mike's presentation included the applications of geophysics to assist with ground and water searches, and in association with IUGS-IFG. Information was supplied by Laurance Donnelly for inclusion in the presentation to students.

#### The Year of Mud, How Volcanoes Solve Crime, Northern Ireland, February 2015

'The Year of Mud', was one of the Geological Society's themes for 2015. In collaboration with the Geological Survey Northern Ireland, the Northern Ireland Regional Group of the Geological Society of London and International Union Of Geological Sciences, on 19th February 2015, Jennifer McKinley and Alastair Ruffell ran two events entitled, 'How can Volcanoes Help Solve Crime? The events included an overview entitled, 'What is forensic geology and how has geology helped to solve several high profile criminal cases in the UK and internationally?' For example how can soil found on a shoe help to solve a crime? The story of an ancient volcanic landscape

was revealed and how volcanoes can help to solve crime. A series of interactive talks were followed by a treasure hunt for forensic geological clues using exhibition material in the Ulster Museum will reveal how a forensic geologist thinks and show how an understanding of geological processes and environments can assist in unravelling the crime. The event attracted 75 attendees, with 75% of being under the age of 15, who participated in examining soil and footwear treads. This formed part of a Northern Ireland Science Festival, the first of its kind in Northern Ireland and attracted thousands of people to an amazing diversity of science events across the country.



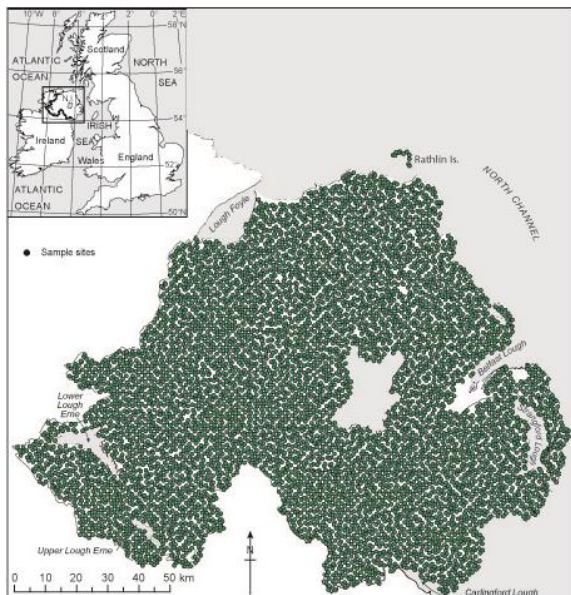
Collection of geological (trace) evidence (soils) on a shoe (for the 2015 Northern Ireland Science Festival Event) (photo: Jennifer McKinley).

#### IUGS-IFG Newsletter, June 2015

In June 2015, the second IUGS-IFG newsletter was finalised, approved, published and issued globally.

#### Tellus Soil and Sediment Geochemistry

Alastair Ruffell and Jennifer McKinley considered baseline, spatially-referenced data on soil and sediment properties such as the 'Tellus' and 'TellusBorder' soil and stream sediment geochemical maps, provide invaluable intelligence when used in conjunction with information relating to the context of a particular crime to determine the provenance of a displaced sample. Such material may be have adhered to a suspect's footwear, clothing, vehicle, weapon, contraband, or in the case study, a spade used to allegedly excavate an area for the concealment of a mortar and mortar rounds. The Tellus data may also provide information on the variation in soils, but due to differences in sampling resolution between a scene of crime, alibi locations, and the Tellus data itself, maybe undermined in its efficacy if used as *prima facie* evidence in a court of law.



*The sampling density of Tellus soil samples that has been used for geological (trace) evidence (source: Jennifer McKinley).*

#### **Operational Support, Rape Case, England, March 2015**

In March 2015, Dr Laurance Donnelly provided information on the geology of a rock sample used during the brutal rape of a woman to see if it could be determined the source and location of the rock.

#### **Experimental Deployment of GPR to Locate a Grave, England, April 2015**

Laurance Donnelly and Alastair Ruffell deployed Ground Penetrating Radar (GPR) over established control sites in northern England, in association with the search for a shallow grave for a missing person. The preliminary results were conclusive in detecting the buried items, which were undetected at the time of their initial burial. The change in the physical properties of the reinstated soils over a period of approximately 8 years was envisaged to be significant for the deployment of GPR in the geological conditions encountered. The results were subsequently presented in France and Japan in August and September 2015, respectively.

#### **Water Searches, England**

In collaboration with the UK Home Office, Centre for Advanced Science and Technology (CAST) and the North West Police Underwater Search and Marine Unit, Laurance Donnelly, Alastair Ruffell and Mike Ferguson (CAST) arranged for an experimental deployment of sonar and water penetrating radar searches of a canal in Liverpool, UK. The experimental techniques worked well and were able to locate items in the canal.



*Laurance Donnelly and Alastair Ruffell conducted experimental GPR over a suspect homicide grave in Northern Europe (photo: Laurance Donnelly)*

#### **Search for Missing Persons, Colombia, South America**

In 2009, Carlos Molina, Laurance Donnelly, Ray Murray, Bill Schneck and Alastair Ruffell delivered a series of training courses in Forensic Geology, at the National University of Colombia, Department of Geology, in Bogota, Colombia together with Colombia's National Institute of Medical, Legal and Forensic Sciences. This included collaboration with the Colombian Police and Instituto Nacional De Medicina y Ciencias Forense (National Forensic Crime Laboratories). Since this course, IUGS-IFG has continued to support the development of Forensic Geology in Colombia. In April 2015, Carlos Molina provided an interview to discuss the search for missing persons in Colombia. The number of people in Colombia who are missing is 85,000 (according to the National Register of Missing People (RND)), although some in Colombia suggest this figure is around 96,000. Of these, a significant proportion is estimated to be involuntary disappearances (c19,000 in 2014). Carlos, working on his PhD continues to apply geological methodologies and search strategies techniques developed by IUGS-IFG and others to search for missing person's graves. Further details

can be found at <http://www.vice.com/read/the-grave-hunter-0000622-v22n4>



*IUGS-IF research on missing persons and searching for graves in Colombia (photo: Carlos Molina).*

#### **European Network of Forensic Science Institute (ENFSI), Riga, Latvia, April 2015**

The 4th ENFSI annual meeting was hosted on 16<sup>th</sup> to 17th April 2015 by the European Network of Forensic Science Institutes, at Riga, in Latvia. Lorna Dawson gave several invited presentations and took part in a related workshop. There were three sessions, 'Wildlife and Non-human DNA', 'Soil' and 'Morphology'. In addition, there was a 'bring an unsolved case to the group' session, which was useful for sharing ideas and best practice.

#### **Geology and Environment for Manchester Students, (GEMS), Manchester, England, April 2015**

On 20th April 2015, Laurance Donnelly gave a presentation to GEMS entitled, 'Forensic Geology: The Applications of Geology to Policing and Law Enforcement.' The event was held in the Williamson Building, University of Manchester, Department of Geology. There was particular interest and discussions on the applications of geology to environmental crimes.

#### **Forensic Geology, Hyperbad, India**

Ruth Morgan visited in Hyperbad, in India and represented IUGS-IFG, she gave a series of presentation to outline the applications of forensic geology and forensic science to police and criminal investigations.

#### **Wildlife Crime Scene and Field Investigation Seminar, Montana, USA, May 2015**

On 13th May 2015, Ray Murray developed a program which attracted wildlife enforcement officers from around the world. Ray delivered a two hour presentation on, 'Forensic Geology and its Application in Wildlife Investigations.'

#### **Training in Soil Forensic Microscopy Techniques, Namur, Belgium, May 2015**

On 22nd to 27th May 2015, Skip Palenik ran a week long training course in pollen and mineral extraction and characterisation, focussing on microscopy when samples are minute in size. A range of participants from across Europe attended and enjoyed a very well run course. The course was run in Namur, Belgium. This was organised from the Animal, Soil, Plant Trace (ASPT) working group of the ENFSI network who invited anyone from the the INEF IFG group to attend. Lorna Dawson gained great knowledge and experience by working with a very informed and experienced group.

#### **MSc in Forensic Geology, University of Messina, Sicily, Italy, June 2015**

In 2014, Prof Roberta Somma (Università degli Studi di Messina, Dean of the Master in Forensic Geology, Dipartimento di Scienze dell'Ambiente, Messina, Sicily) and Dr Rosa Maria di Maggio (IFG Officer for Europe) approached IUGS-IFG to support the establishment of a new MSc course in Forensic Geology. IUGS-IFG officers were subsequently assigned to the course organising committee.

The first part of the course took place in June 2015, followed by a second stage in September 2015. The course content and structure was steered and supported by Rosa Maria Di Maggio, Laurance Donnelly, Lorna Dawson, Jennifer McKinley and Pier Matteo Barone (The America University of Rome). The course was attended by approximately 150 delegates, and supported in collaboration with the Polizia di Stato, Carabinieri, Geoscienze Forense, Alfatest, Malvern, the James Hutton Institute, Queens University Belfast, Ambregeo, Consiglio Nazionale Dei Geologi and the Geological Society of London, Forensic Geoscience Group.

The course was heavily publicised and gained much media attention, including national TV coverage through Italy and Sicily.

The course content included a series of formal lectures followed by knowledge transfer events and field training in: the background, history and global developments of forensic geology; design and implementation of ground searches for buried and concealed items including graves, human remains, drugs, explosives and firearms; crime scene examinations; soil sampling and laboratory analysis; Working with the police and law enforcement; and Selected operation cases.





*IUGS-IFG officers (Alastair Ruffell, Jennifer McKinley, Lorna Dawson, Laurance Donnelly, with Pier Matteo Barone who participated with Roberta Somma in the MSc in Forensic Geology, Messina, Sicily, Italy in the (photo: Università degli Studi di Messina).*



*IUGS-IFG officers demonstrate the collection of geological (trace) evidence, Italy (photo: Laurance Donnelly)*



*IUGS-IFG officers demonstrate the search and recovery of a buried item, MSc in Forensic Geology, Messina, Sicily, Italy in the (photo: IFG and Università degli Studi di Messina).*

**Search for a Suspected Missing Person, Scotland, July 2015**

Through the first half of 2015, Laurance Donnelly, Alastair Ruffell and Lorna Dawson assisted the Police and Home Office in a search for a missing person in Scotland. This included the provision of a search strategy and the deployment of geophysical search assets in July 2015.

**Planning for 3rd Iberoamerican Course on Forensic Geology, Argentina, August 2015**

Carlos Molina Galego and Fabio Augusto Da Silva Salvador approached IUGS-IFG committee with plans for the 3rd Iberoamerican Course on Forensic Geology. IUGS-IFG committee members were involved in the management of the 1st course (in Colombia, 2009) the 2nd course (in Brazil, 2013). The 3rd course was originally proposed to take place in Argentina in 2016, but this was changed to 2017, due to possible clashes with the 35<sup>th</sup> IGC in Cape Town.

**European Meeting on Forensic Archaeology, Pontoise, France, August 2015**

The 4th European Meeting on Forensic Archaeology (EMFA) was held on 28<sup>th</sup> to 29<sup>th</sup> August, in Pontoise, France. EMFA is a joint venture between the Forensic



Science Institute of the French Gendarmerie (IRCGN) and the ENFSI project group Forensic Archaeology. The theme of the conference was, *'Crime Scene: Role of the Forensic Archaeologist in a Multidisciplinary Team'* and has a stated purpose of discussing the present and future state of forensic archaeology in European countries, to present relevant case studies, research and development. Several speakers from the IUGS-IFG were represented, including Alastair Ruffell and Lorna Dawson.

#### **Search for Missing Person in a Lake, Northern Ireland**

Alastair Ruffell assisted the Police with a search for a missing person in a lake. Guidance on search strategies and techniques was provided by Laurance Donnelly.

#### **Crime Writers Festival, Harrogate, England**

IUGS-IFG was represented at the Harrogate Crime Writers Festival by Lorna Dawson. Anne Cleeves has named the forensic geoscientist in her new book *'The Moth Catcher'* as 'Professor Lorna Dawson'. Crime Writer, Mark Billingham, was advised on the science in his recent book, *'Time of Death'* by Lorna Dawson, providing information on rates of decomposition and taphonomic changes. Lorna Dawson, Val McDermid, Sue Black and Niamh NcDaeid presented a Royal Society panel debate on, *'Crime Fact or Fiction'* in London as part of the Royal Society Summer Science Exhibition. All tickets were sold and over 200 attended and enjoyed the event. Also In 2015, Laurance Donnelly provided advice and guidance to a crime writer on geological accuracy for crime novel.

#### **Location of Graves Using Victim Detector Dogs, England and Europe**

Laurance Donnelly and Martin Grime (former British Police and FBI canine trainer), with support from Alastair Ruffell and Mark Harrison explored research opportunities aimed at better understanding the deployment of victim detector dogs to locate homicide graves and to explain the generation of false-positive indications.

#### **International Symposium on the Development of Forensic Geology, Nagano, Japan, September 2015**

Throughout 2013 and 2014 Ritsuko Sugita and Laurance Donnelly planned and organised a Forensic Geology event in Japan. This was held at the 122nd Annual Meeting of the Geological Society of Japan, on 9th to 13th September, at Nagano, in Japan. Presentations were delivered by the Japan National Research Institute of Police Science Alastair Ruffell, Jennifer McKinley, Ray Murray and several posters were displayed. This symposium was the first of its

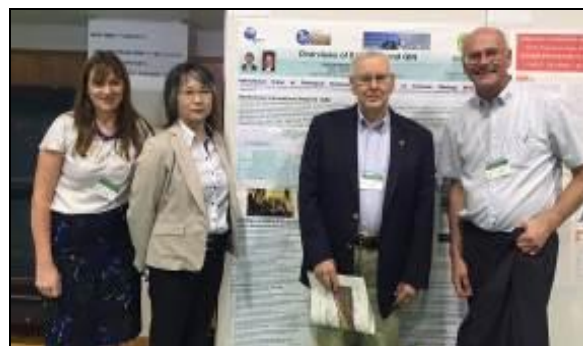
kind in Japan and focussed on the application of geology and its applications to criminal investigations in Japan. It was attended by the Japan Coast Guard Academy, Research Institute of Environmental Geology of Chiba Prefecture, Kagoshima University and Oxford Instruments. The program was a great success and attended by 35 invited delegates. Attendees were mostly Japanese with some from Southeast Asia and Africa.



*Ritsuko Sugita, Alastair Ruffell, Jennifer McKinley and Ray Murray with delegates at the International Symposium on the Development of Forensic Geology, Nagano, Japan (Photo: Ritsuko Sugita).*

#### **Forensic Geology in Hong Kong, September 2015**

On 13th to 20th September 2015, IUGS-IFG was represented in Hong Kong by Alastair Ruffell and Jennifer McKinley in association with the Hong Kong Regional Group of the Geological Society. They presented a joint talk on Forensic Geology to the Hong Kong Regional Group of the Geological Society (Fergus Cheng, President) of London and discussed the development of Forensic Geology throughout China and globally.



*IUGS-IFG team in Japan (Jennifer McKinley, Ritsuko Sugita, Ray Murray, Alastair Ruffell) (photo: Alastair Ruffell)*



IUGS-IFG officers (Alastair Ruffell and Jennifer McKinley) with the chair of the Hong Kong Regional Group of the Geological Society. (photo: Hong Kong Regional Group of the Geological Society).

**International Conference on Engineering Geophysics, Al Ain, UAE, November 2015**

The 3rd International Conference on Engineering Geophysics was held in Al Ain, UAE from 15th to 18th November 2015. Laurance Donnelly formed a member of the Technical Committee and organised the session on Forensic Geology. It was attended by Laurance Donnelly, Alastair Ruffell and Lorna Dawson. IUGS-IFG also collaborated with Colin Hope, in his role as UK National Search Adviser (National Crime Agency), to build upon the advancements and training provided in 2012 in UAE with the Abu Dhabi Police.



IUGS-IFG & the International Symposium on Development of Forensic Geology, 122nd Annual Meeting of the Geological Society of Japan

**IUGS-IFG Sub-Committee Meeting, England, Scotland & Northern Ireland**

On 6th November 2015, a sub-committee meeting was held by teleconference to discuss the progress and publication of, 'A Guide to Forensic Geology', the 35th IGC in Cape Town, operational case work and the future development of IUGS-IFG, and finance and funding.



Abu Dhabi Police, Forensic Geology Group, at the 3rd International Conference on Engineering Geophysics was held in Al Ain, UAE (photo: Hong Kong Regional Group of the Geological Society).



IUGS-IFG demonstrate ground search strategies for burials, Abu Dhabi Police (photo: Laurance Donnelly)



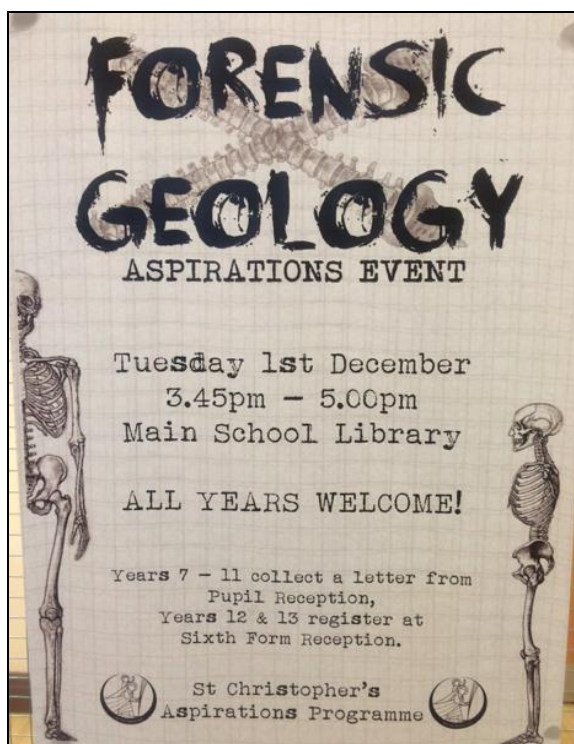


**International Journal of Geosciences applied to Cultural Heritage and Forensics**

Pier Matteo Barone, Adjunct Professor, Archaeology and Classics invited members of the IUGS-IFG to act as Editorial Board members for a new, peer-review journal, 'International Journal of Geosciences applied to Cultural Heritage and Forensics', by Science Publishing Group

**St Christopher's High School, Accrington, Lancashire, UK, December 2015**

On 1st December 2015, Laurance Donnelly was invited into St Christopher's High School, in Lancashire, England, to deliver a presentation on geology, to 12-16 year old pupils as part of the 'Aspirations Programme'. This included Forensic Geology and examples of how geologists may assist the Police investigate some crimes such as; ground searches for burials, water searches, crime scene examinations, geological trace evidence and environmental crimes.



*IUGS-IFG present to school children on Forensic Geology, Accrington, Lancashire, UK*

**Police National Search Centre, The College of Policing, Coventry, UK, December, 2015**

On 17th to 18th December 2015, Laurance Donnelly was invited to participate in a national Continuation of Professional Development (CPD) event for PoISAs (Police Search Advisors). This included the provision of new search strategies and techniques to locate

burials relate to homicide, terrorism and organized crime.

**Geoinformatics in Forensic Geology with IAMG**

A strong link with the IAMG (Jennifer McKinley is Executive Vice President of the IAMG), continues to provide opportunities to develop the appropriate and robust use of spatial statistics, geoinformatics and Geographical Information Science (GIS) in Forensic Geology.

**IUGS REVIEW OF IFG**

In April 2016, IUGS carried out a mandatory 5 years review of the IFG. This was undertaken in Manchester, UK where Laurance Donnelly (Chair, IUGS-IFG) was interviewed by Prof Jose Calvo (IUGS Secretary General) and Prof Marko Komac (Vice-President of the IUGS). Inspector Colin Hope (National Crime Agency, UK National Police Search Adviser) and Alastair Ruffell (IFG Training Officer) attended were also present. Laurance provided a presentation that described the background, history, evolution, development, methodologies and achievements since the inception of IFG in 2011 to 2016. IUGS were satisfied with the progress made by IFG and the continuation of IFG was subsequent agreed.



*IUGS-IFG officers demonstrate the search and recovery of a buried item, MSc in Forensic Geology, Messina, Sicily, Italy in the (photo: IFG and Università degli Studi di Messina).*

**SELECTED 2016 EVENTS**

- February 2016: IUGS-IFG Involvement in 2016 Northern Ireland (NI) Science Week. The second annual NI Science Festival will run over 11 days from 18<sup>th</sup> – 28<sup>th</sup> February 2016, with over 100 events across Northern Ireland);
- February 2016: Public outreach event 'Sherlock Holmes, CSI and Geology - how geologists help solve crimes' in association with the Geological Society London Forensic Geoscience Specialist



- Group, and Geological Society 'Year of Water' supported by the NI Regional Geological Society group;
- April 2016: Forensic geology event in Dublin with the Geological Survey of Ireland and the Institute of Geologist of Ireland;
- June 2016: IFG presentation for EMRG and British Geological Survey, Nottinghamshire, UK
- August-September 2016: Forensic Geology session, of the 36th International Geological Congress (IGC), in Cape Town, South Africa;
- September 2016: Invitation to Interpol symposium, Czech Republic.
- December 2016: 10<sup>th</sup> Anniversary of the Geological Society of London, Forensic Geoscience Group (FGG);
- 2016: Advancement of the investigation of the potential for the detection of VOC and leachate from homicide graves;
- 2016: Provide training and support in ground searches for burials and evidence, for UK Police;
- 2016: Complete writing and issue to the IUGS-IFG Committee a preliminary draft of, 'A Guide to Forensic Geology';



*IUGS-IFG with staff and delegates from the MSc in Forensic Geology, University of Messina, Sicily, Italy*



*Forensic geology marketing image used by IUGS-IFG and Geological Society of London (GSL) Forensic Geoscience Group (FGG) (source: GSL, FGG)*



**CONTACT DETAILS**

For further information

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



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