



INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

INITIATIVE ON FORENSIC GEOLOGY (IFG)

ANNUAL REPORT 2013

DR LAURANCE DONNELLY, CHAIR IUGS-IFG

DATE ISSUED: 15th December 2013
REPORT NUMBER: IUGS-IFG\001
REPORT STATUS: Submitted Draft on 15.12.2013

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

Annual Report 2013

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**INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS),
INITIATIVE ON FORENSIC GEOLOGY (IFG)
ANNUAL REPORT FOR 2013**

1 TITLE OF CONSTITUENT BODY

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 22 February 2011.

2 AIM

2.1 Mission Statement

IUGS-IFG seeks to; *'to develop forensic geology internationally and promote its applications'*.

2.2 Objectives

The objectives of the IUGS-IFG are to:

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

3 ROLE WITHIN IUGS SCIENCE POLICY

3.1 Background

Although the documented history of forensic geology can be traced to the latter half of the 19th Century, in the past ten years or so there have been significant interests and developments in the multidisciplinary fields of forensic geology throughout the world. Since the millennium there have been numerous international meetings, conferences and seminars on different aspects of forensic geology. Furthermore, several significant text books have been published on the subject and numerous technical papers in scientific journals, conference proceedings, magazines and newspapers have been published. IFG represents IUGS interests in forensic geology and provides the mechanism for capacity building, knowledge transfer and outreach events, promoting our mission, *'to develop forensic geology internationally and promote its applications'* around the world. The members of the IFG committee are senior representatives of their respected organisations and include geologists, geoscientists, police officers, forensic scientists and law enforcement agencies.

3.2 Main Approach

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

- **Capacity building:** By raising levels of awareness, knowledge and providing information about forensic geology;
- **Technology transfer:** The actual improvement in skill sets; and
- **Outreach:** Educating and informing the police, law enforcement organisations, geologists, geoscientists and the 'general public' about forensic geology.

4 ORGANIZATION

The IUGS-IFG Committee comprises representatives from major geographical regions of the world and includes specialists from academia, industry, consultancy, operationally based forensic geologists, the police, law enforcement agencies and forensic organisations, as shown in Figure 1 and Table 1.

4.1 IFG Committee Changes

Lorna Dawson replaced Duncan Pirrie as Treasurer.

Jennifer McKinley replaced Lorna Dawson as Communications Officer. Jennifer has also taken on the responsibility for the development and production of the IFG Newsletter.

Prof Grant Wach was assigned as the IFG Officer for Canada and Shari Forbes was assigned as the IFG Officer for the Pacific region.

The IFG Middle East Officers are Cpt. Ahmed Saeed Al Kaabi, Cpt. Khudooma Said Al Naimi & Lt. Saleh Alkathiri; all who work with the Abu Dhabi Police.

5 EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

During 2013 support for IUGS-IFG was provided by both individuals and their employers/organisations. The in-kind value of this support is considerable. We estimate that the Committee Officers have put in at least **100 person days** in the last year attending IFG conferences, training courses, provision of outreach, along with the management of the initiative.

The value of this in-kind support is difficult to quantify. IFG are fortunate in bringing together the leading forensic geologists world-wide and a commercial value to the time spent on the IFG to date would be in excess of **£100,000 UK sterling equivalent or approximately USD(\$163,000).**

In addition, participation in the various IFG events during the year has also been supported directly by Committee employers and via research funding. We estimate the value of this direct funding support to be in excess of **£25,000 UK sterling equivalent or approximately USD(\$40,700).**

5.1 Acknowledgements

Throughout 2013, IUGS-IFG received support from numerous organisations, which include the following:

- **IUGS President (Prof. Dr. Roland Oberhaensli), Secretary General (Dr Ian Lambert), Treasurer (Prof Dong Shuwen) and Executive Committee.**
- IFG would also like to express gratitude to **Peter Bobrowsky**, Colin Simpson, Brian Marker and Kevin Telmer for their support and encouragement for the global development and advancement of forensic geology

- **Commercial companies:** Wardell Armstrong International (UK), Helford Geoscience LLP (UK), Microtrace LLC (USA) and Geoscienze Forensi Italia (Italy).
- **Police, law enforcement and government agencies:** California Department of Justice, Federal Bureau of Investigation (USA), Australia Federal Police (Australia), Washington State Patrol Crime Lab (USA), Abu Dhabi Police (UAE), UAE Navy, UAE Coast Guard, Russian Federal Centre of Forensic Science (RFCFS) of the Ministry of Justice of Russia (Russia), National Research Institute of Police Science of Japan (Japan), Servizio Polizia Scientifica (Italy), Brazilian Federal Police (Brazil), National Crime Agency (NCA) (UK), Serious Organised Crime Agency (SOCA) (UK), National Policing Improvement Agency (UK), Home Office Centre for Applied and Scientific Research (CAST) (UK), Greater Manchester Police (GMP) (UK), Leicestershire Police (UK), Devon & Cornwall Police (UK), Interpol (Europe), Inspector Graham Peffers (GM), Inspector Colin Hope (NCA), Mike Ferguson (CAST), Carlos Antônio Almeida (Associação Nacional dos Peritos Criminais Federais), Júlio César Kern (Instituto Nacional de Criminalística) and José Jair Wermann (Diretoria Técnico-Científica, BFP).
- **Universities and research institutes:** University of Pretoria (South Africa), Dalhousie University (Canada), Russian Federal Centre of Forensic Science (RFCFS), National Research Institute of Police Science (Japan), CSIRO (Australia), Centre for Australian Forensic Soil Science (CAFSS) (Australia), University of Adelaide (Australia), Flinders University (Australia), Buffalo State College (USA), Queens University Belfast (Northern Ireland), the James Hutton Institute (Scotland, UK), University of Canberra (Australia), University of Technology, Sydney (Australia), Geological Society of London (UK), University of Pretoria (South Africa), Nacional Institute of Criminalistics (INC) (Brazil), Instituto Nacional de Medicina Legal y Ciencias Forense (Colombia), United Arab Emirates University, Al Ain, (UAE), Eng. Suhail Thani Al-Muhairi Al Ain City Municipality), Prof Smirnova (RFCFS) and Prof Haydar Aziz Baker United Arab Emirates University, Ray Murray.

6 INTERACTION WITH OTHER INTERNATIONAL PROJECTS

Throughout 2013, IUGS-IFG interacted and collaborated with the following organisations and projects:

- Geological Society of London, Forensic Geoscience Group (FGG) (South America, Russia and Middle East);
- CSIRO/CAFSS, (Australia & Russia);
- International School Science Fair (ISSF), Camborne Science and International Academy and Devon & Cornwall Police (UK);
- UK National Policing Improvements Agency (NPIA), Arts & Humanities Research Council, Serious Organised Crime Agency (SOCA) and the UK Missing Persons Bureau and Leicestershire Police (UK);
- European Geosciences Union (EU), General Assembly (Vienna);
- Forensic Geoscience, Chiba (Japan);
- 1st Heavy Mineral School (Italy);
- The International School Science Fair (ISSF) (UK);
- 2nd Ibero Latin American Conference on Forensic Geology (Brasil);
- Brazilian Federal Police forensic geology (Brasil);
- Russian Federal Centre for Forensic Science (RFCFS), of the Ministry of Justice of Russia, in Moscow (Russia);

-
- Geological Society of America Annual Conference (USA);
 - Forensic archaeology conference (Italy);
 - Servicio de Criminalística of Guardia Civil (Spain);
 - European Association of Geoscientists & Engineers (EAGE) and United Arab Emirates University, Al Ain, UAE, 2nd International Conference on Engineering Geophysics (UAE);
 - Abu Dhabi Police (UAE);
 - United Arab Emirates Navy & Coastguard (UAE);
 - Scientific Working Group-Geological Materials (SWGGeo) (USA);
 - Geophysics Special Interests Group (GeoSig), Institute for Archaeologists (IFA) (UK);
 - MiSAFE FW 7 EU project, and
 - International Association of Mathematical Geoscientists (IAMG).

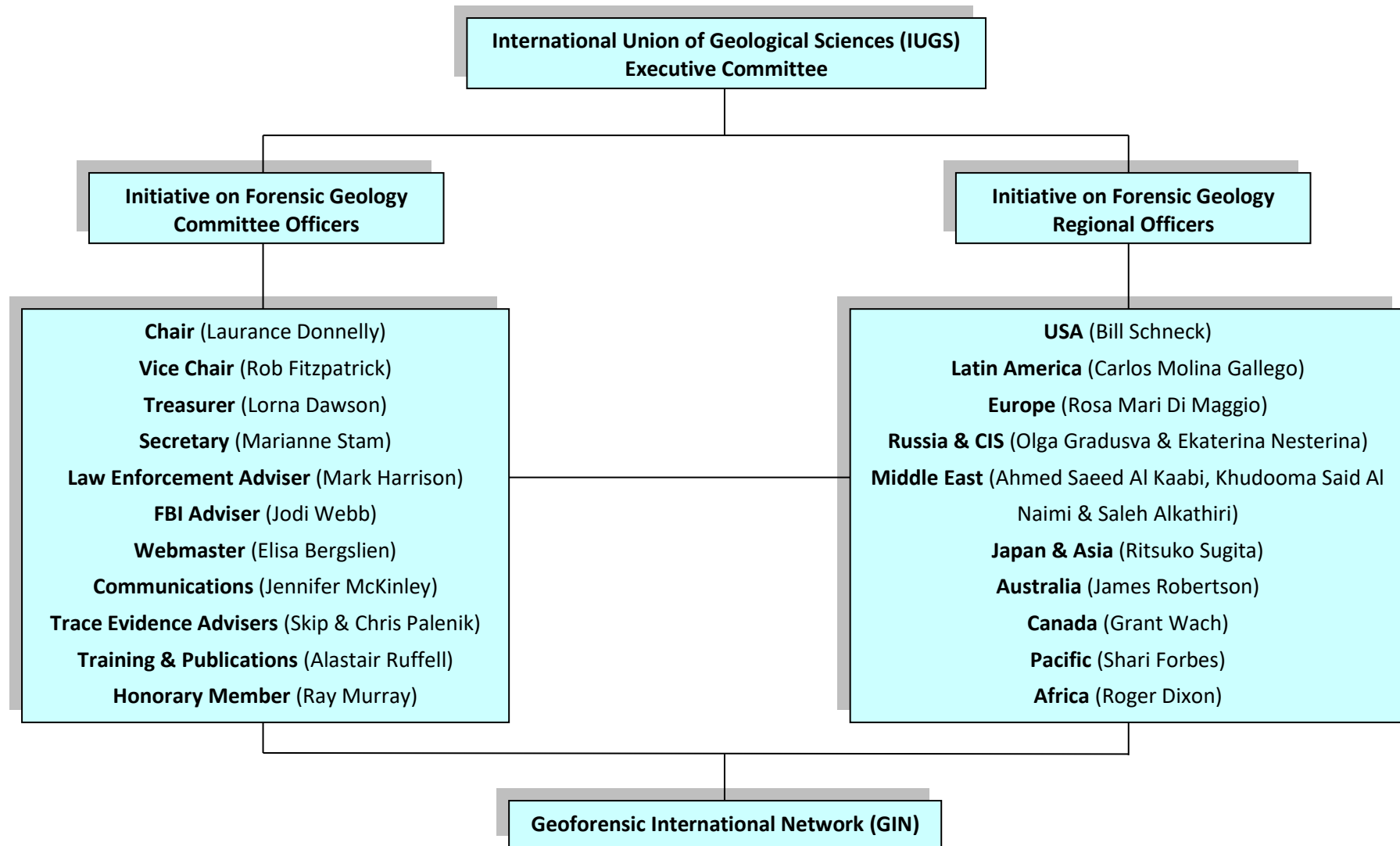


Figure 1. The general structure of IUGS-IFG Committee in 2013

POSITION	NAME	COUNTRY	AFFILIATION	EMAIL
Chair	Dr Laurance Donnelly	England (UK)	Wardell Armstrong International	ldonnelly@wardell-armstrong.com
Vice Chair	Prof Rob Fitzpatrick	Australia	CSIRO	Rob.Fitzpatrick@csiro.au
Treasurer	Prof Lorna Dawson	Scotland (UK)	The James Hutton Institute	lorna.dawson@hutton.ac.uk
Secretary	Ms Marianne Stam	USA	California Department of Justice	marianne.stam@doj.ca.gov
Webmaster/Information Officer	Dr Elisa Bergslien	USA	Buffalo State University	BERGSLET@buffalostate.edu
Geoforensic Law Enforcement Adviser	Commander Mark Harrison, MBE	Australia	Australia Federal Police	Mark.Harrison@afp.gov.au
FBI Adviser	Dr Jodi Webb	USA	Federal Bureau of Investigation (FBI)	Jodi.Webb@ic.fbi.gov
Training and Publications	Dr Alastair Ruffell	UK (Ireland)	Queens University Belfast	a.ruffell@qub.ac.uk
Communications	Dr Jennifer McKinley	UK (Ireland)	Queens University, Belfast	j.mckinley@qub.ac.uk
Geological (Trace) Evidence Advisers	Dr Skip Palenik Dr Chris Palenik	USA	Microtrace	SPalenik@microtracescientific.com CPalenik@microtracescientific.com
Honorary Committee Member	Dr Raymond Murray	USA	Forensic Geologist, Montana	rmurray@bresnan.net
Officer, USA	Dr Bill Schneck	USA	Washington State Patrol Crime Lab	Bill.Schneck@wsp.wa.gov
Officer, Latin America	Mr Carlos Molina Gallego	Colombia	Instituto Nacional de Medicina Legal y Ciencias Forense	marmolgal@gmail.com
Officer, Europe	Ms Rosa Maria Di Maggio	Italy	Geoscienze Forensi Italia (Formerly Servizio Polizia Scientifica)	rosamaria.dimaggio@gmail.com
Officer, Russia & CIS	Dr Olga Gradusva Dr Ekaterina Nesterina	Russia	Russian Federal Centre of Forensic Science and Soil Trace Evidence Experts	APOSTOL137@yandex.ru bio_soil@rambler.ru
Officer, Middle East	Captain Ahmed Saeed Al Kaabi Captain Khudooma Said Al Naimi Lt.Saleh Ali Al Katheeri	UAE	Abu Dhabi Police, Forensic Evidence, United Arab Emirates Abu Dhabi Police, Forensic Evidence, United Arab Emirates Abu Dhabi Police, Forensic Evidence, United Arab Emirates	asm5995@gmail.com khudooma@gmail.com saleh.alkatheeri@adpolice.gov.ae alkhzn@gmail.com
Officer, Japan and Asia	Ritsuko Sugita	Japan	National Research Institute of Police Science, Japan	sugita@nrps.go.jp f_geology@yahoo.co.jp
Officer, Australia	Prof James Robertson	Australia	University of Canberra	James.Robertson@canberra.edu.au
Officer, Pacific	Prof Shari Forbes	Australia	University of Technology, Sydney	shari.forbes@uts.edu.au
Officer, Canada	Prof Grant Wach	Canada	Dalhousie University, Nova Scotia, Canada	Grant.Wach@Dal.Ca
Officer, Africa	Dr Roger Dixon	South Africa	University of Pretoria (Formerly, Forensic Science Laboratory, South African Police Service)	roger.dixon@up.ac.za

Table 1. IUGS-IFG committee members in 2013 and their professional affiliations

7 CHIEF ACCOMPLISHMENTS FOR 2013

7.1 Main objectives for 2013

The IUGS-IFG main objectives for 2013, determined by the IFG Committee, were as follows:

- Provide training and knowledge transfer with the Brazilian Federal Police;
- Assist with the organisation and support of the 2nd Ibero Latin American Conference on Forensic Geology in Brasilia, Brasil;
- Provide a series of outreach and knowledge transfer lecture on soil forensics and associated aspects of forensic geology in association with the Russian Federal Centre of Forensic Science (RFCFS), Ministry of Justice, Moscow;
- Continue to collaborate with the Geological Society of London, Forensic Geoscience Group (FGG);
- Provide technical support for the forensic geology session of the 2nd International Conference on Engineering Geophysics, in UAE;
- Capacity building and training with the Abu Dhabi Police;
- Collaborate with the Scientific Working Group on Geological Materials (SWGCEO);
- Collaborate with the Centre for Australian Soil Forensics (CAFSS); and
- Development of a document for publication; '*A Guide to Forensic Geology*'.

During 2013 IUGS-IFG contributed to and completed the following capacity building, technology transfer and outreach events, which are summarised in chronological order and a selection of photographs are also given in Appendix I:

7.2 IUGS 66th Executive Committee Meeting UNESCO, Paris, France, February 2013

On 20th February 2013, the IFG Chair (Laurance Donnelly) provided an update of IFG events and activities, to the IUGS Executive Committee, during the 66th Executive Committee meeting, held at UNESCO, in Paris. The feedback from IUGS was positive and IFG was encouraged to continue with the good work achieved in promoting and developing forensic geology throughout the world.

7.3 5th London Bullion Market Association Assaying and Refining Seminar, UK, March 2013

Roger Dixon attended the 5th London Bullion Market Association assaying and Refining Seminar in London, on the 10-12 March 2013, where I he a talk about the necessity for having physical record of the source of gold being sold for refining, rather than relying on a paper trail to prove that the material did not originate from conflict areas. Here, in theory, the knowledge of the geological origin and refining methods enables one to determine whether the gold has a tainted or clean origin

7.4 Search Training, Serious Organised Crime Agency, SOCA, Leicestershire, UK, March 2013

On 27th March 2013, Laurance Donnelly took part in a knowledge transfer event and conference with the UK Serious Organised Crime Agency (SOCA), held at Leicestershire Police headquarters, UK. The objective for the conference was to raise awareness regarding the support and guidance available from experts operating within a range of academic disciplines, in the search for missing persons and 'no-body' murder victims. This event was intended for Police Search Adviser (PoISA) and the search community. It provided specific information regarding the contribution that forensic geology, enviro-archaeological profiling, archaeology, anthropology and biology, can make in the development of search strategies and tactics, assisted by information from Lorna Dawson and Alastair Ruffell. Additional expert advice and display materials were available to describe the application and use of geophysical search equipment, victim recovery dogs, and the support available from the National Missing Person Bureau and National Missing Person Adviser.

7.5 European Geosciences Union (EU), General Assembly, Austria, Vienna, April 2013

In April 2013, Lorna Dawson participated in the EGU meeting in Vienna and presented a paper on the aim and objectives of the IUGS Initiative on Forensic Geology. The event was well attended with good and positive feedback and international 'support' for the development of forensic geology.

7.6 Forensic Geoscience, Chiba, Japan, May 2013

In May 2013, Ritsuko Sugita attended the Forensic Geoscience meeting in Japan to discuss global advances in Forensic Geology.

7.7 Police Commission, Missoula, Montana, USA, May 2013

In 2013, Ray Murray became Chair of the Police Commission in Missoula, Montana, USA. On 14 May 2013, Ray spoke at the wildlife crime scene/filed investigation seminar. In 2013, Ray's book, 'Evidence from the Earth', was published as a Chinese edition, by the Laboratory of Evidence Science, Chinese University of Political Science and Law.

7.8 1st Heavy Mineral School, University of Milan, Italy, May 2013

On 1st and 2nd May 2013, Skip Palenik visited the University of Milan and delivered a series of training lectures and practical sessions on the subject of forensic geology, lecturing to around 30-35, attendees, mainly PhD students.

7.9 3rd International Legal Forum which was held in St Petersburg, Russia, May 2013

From 15th-18th May 2013 Roger Dixon was invited by the Ministry of Justice of the Russian Federation to participate in a session devoted to the way forensic science is presented in different countries. The session was chaired by the Director of the Russian Federal Centre for Forensic Science.

7.10 Forensic Geology at the International School Science Fair, Cornwall, UK, July 2013

The International School Science Fair (ISSF) is an annual gathering of young scientists from around the world. The idea was originally conceived in 2004 at the Australian Science and Mathematics School in Adelaide, South Australia, when educators from many countries including; Australia, Singapore, Thailand, Korea and Japan came together and shared their reflections and understandings regarding student and teacher engagement in science and mathematics. This year, the ISSF came to the United Kingdom (UK) for the first time, being hosted at Camborne Science and International Academy, Cornwall. Duncan Pirrie and Laurance Donnelly organised a forensic geology day for the students. The workshop comprised three main events: (a) the World Soil Map 2013 project; (b) a simulated crime scene and geological trace evidence recovery and analysis exercise and (c) a geological ground search for burials, such as weapons and items commonly used in crime, using geophysics. A popular press article was published describing the impact of this event (Pirrie et al., 2013).

7.11 INTERPOL, International Forensic Science Managers Symposium, France, October 2013

This 17th international meeting is held every three years, and in 2013 it took place from the 8th-10th October 2013 in Lyon France (Ritsuko Sugita, 杉田 律子, 科警研, National Research Institute of Police Science). This important forum brings together laboratory managers from INTERPOL countries across the world. At this meeting, Ritsuko Sugita presented an overview of forensic geoscience around the world as part of an international review on forensic science. Lorna Dawson presented a keynote talk on 'State of the Art Forensics' in forensic science, featuring forensic geology and forensic soil science. Both members of IUGS IFG outlined the extensive work of the IUGS-IFG and flyers were distributed at the poster session held in the INTERPOL headquarters in

Lyon, France. Discussion with crime scene managers was held and an exchange of methods applied in different countries was carried out.

7.12 2nd Iberoamerican Workshop & Training, Brazilian Federal Police, Brazil, October 2013

This event was run in association with the Brazilian Federal Police (BFP), Geological Society of London, Forensic Geoscience Group,. The event was organised by Carlos Molina, Laurance Donnelly (IUGS-IFG), Marcelo Blum, Daniel Russo and Fabio Augusto da Silva Salvador from the Brazilian Federal Police (BFP). This took place at Nacional Institute of Criminalistics (INC), Brasilia, Brazil, from the 2nd-4th October 2013. A series of presentations were followed by practical training sessions provided by IFG committee members including Alastair Ruffell, Carlos Molina, Shari Forbes, Jennifer McKinley and Roger Dixon. The workshop comprised two days of technical presentations and discussions, followed by a day-long training course in forensic geology. The Federal Police test site 'SITCRIM' was used as a mock crime scene with which to evaluate the samples. This facility was created specifically to test equipment used in search and proved invaluable as a location for discussion of sampling locations (routes of access, suspect ground), and to deploy a spatial sampling scheme. Buried targets included a pig cadaver, loose cow bones, weapons (rifle and handgun), shell casings, barrels filled with a variety of materials (air, liquid and explosives), boxes and a computer.

7.13 RFCFS, Ministry of Justice of Russia, Moscow, October 2013

A soil forensics and forensic geology knowledge transfer event was organised by the IUGS-IFG (Laurance Donnelly, Olga Gradusva and Ekaterina Nesterina), the Russian Federal Centre of Forensic Science (RFCFS), of the Ministry of Justice of Russia and the Geological Society of London Forensic Geoscience Group. This took place on 22nd October 2013 in Moscow, as part of a four day conference. This was the first international event of its kind to be hosted in Russia and the Commonwealth of Independent States (CIS) to specifically focus on soil forensics and forensic geology. A series of presentations and discussions were given by Laurance Donnelly, Rob Fitzpatrick, Alastair Ruffell, Lorna Dawson, Jennifer McKinley and Rosa Maria Di Maggio. The event was hosted by Prof Smirnova (Director, RFCFS), Ekaterina Nesterina and Olga Gradusva. It was attended by the Ministry of the Interior of Russia, the Police Service, Investigative Committee of Russia, Federal Drug Control Service of Russia and the Federal Security Service of Russia. Delegates were invited from Armenia, Australia, Azerbaijan, Belarus, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Netherlands, Northern Ireland, UK, Ukraine and USA.

7.14 Geological Society of America (GSA), Denver, Colorado, USA, October 2013

IFG sponsored a forensic geology poster session at the GSA in Denver to help raise the profile and development of forensic geology throughout the USA and globally.

7.15 Geophysics Special Interests Group, Institute for Archaeologists (IFA), UK, October 2013

IUGS-IFG continued to develop strong links with the Geophysics Special Interests Group (GeoSig) to promote and develop association between forensic geology and forensic archaeology. In October 2013, Alastair Ruffell attended a GeoSig meeting in Bradford, UK, to discuss ideas for further collaboration including a joint meeting in 2014, in association with the Geological Society of London, Forensic Geoscience Group and Near Surface Geophysics Group.

7.16 Servicio de Criminalística of Guardia Civil, Madrid, Spain, November 2013

On 26th-27th November, Lorna Dawson delivered a session on soil as evidence at the Seminary 'Análisis Criminalístico de Suelos II'. The event was well attended and interaction was good with discussion about the range of analytical approaches used in the different European countries. The IUGS-IFG flier was distributed to attendees.

7.17 Lapworth Lecture on Forensic Geology, Birmingham, UK, November 2013

On Monday 4th November 2014 Alastair Ruffell delivered a lecture on forensic geology for the Lapworth Society, at Birmingham University, UK. The event was well attended with post lecture student discussion on the use of geological trace evidence to help investigate crimes.

7.18 Forensic Archaeology, Rome, Italy, November 2013

Alastair Ruffell and Rosa Maria Di Maggio attended the, 'International Workshop on Forensic Science and Archaeology' held on 22nd and 23rd November at the American University of Rome. The workshop was based on two different aspects of forensic archaeology: locating crime sites, and analysing crime sites. Presentations and discussion on search and localization by means of geophysics, remote sensing, and geological materials were given by Ruffell and Di Maggio who had the opportunity to introduce the structure, aims and activities of the IUGS Initiative on Forensic Geology. This gained the interest of a number of participants who expressed interest in being part of the Geoforensic International Network (GIN), news of who will follow.

7.19 2nd International Conference on Engineering Geophysics, Al Ain, UAE, November 2013

From 24th-27th November 2013, IUGS-IFG participated in the European Association of Geoscientists and Engineers (EAGE), 2nd International Conference on Engineering Geophysics, held at the United Arab Emirates University, Al Ain, United Arab Emirates (UAE). Laurance Donnelly was a member of the conference Technical Committee and delivered the forensic geology keynote lecture on 25th November 2013, '*the Applications of Forensic Geology & Geophysics to Police and Law Enforcement Ground Searches*'. Other presentations were given on ground searches, geophysics and geological trace evidence; by Saleh Ali Al Katheeri (Abu Dhabi Police), Colin Hope (Police National Search Adviser, National Crime Agency, UK), Mike Ferguson (Home, Centre for Applied Science and Technology, UK), Graham Peffers (Greater Manchester Police, Force Police Search Adviser UK), Jamie Pringle (University of Keele, UK), Peter Bull and Ruth Morgan (University of Oxford and University College London, UK), Peter Masters (Cranfield University and UK Defence Academy) and Skip Palenik (Microtrace, USA). The event was attended by approximately 150-200 delegates and included the Abu Dhabi Police, and police forces and forensic geologists from Oman, Kuwait, Qatar and Saudi Arabia. The event was highly successful and provided the basis for the expansion of forensic geology in the Middle East.

7.20 Abu Dhabi Police, Forensic Evidence Department, Abu Dhabi, UAE, November 2013

On 27th November 2013, IUGS-IFG delivered a series of capacity building presentations to the Forensic Evidence Department, Abu Dhabi Police, at their headquarters in Abu Dhabi. The event was organised by Saleh Ali Al Katheeri (Abu Dhabi Police and IUGS-IFG representative for Middle East) with support from Laurance Donnelly. Presentations were given on police and geological strategies for searching the ground, vehicles, buildings and marine environments and on the use of geological trace evidence to help identify (provenance) search areas. Presentations were delivered by Laurance Donnelly, Colin Hope, Mike Ferguson, Graham Peffers, Peter Masters, Peter Bull and Ruth Morgan. The formal presentations were followed by demonstration and training on deployment of ground penetrating radar and electromagnetic search assets to locate a firearm, which was buried in a secure control site within the grounds of Abu Dhabi Police headquarters. Practical advice was also provided on counter-terrorism vehicle and building searches for Improvised Explosive Devices (IEDs).

7.21 Abu Dhabi Navy and Abu Dhabi Coast Guard, United Arab Emirates (UAE), November 2013

On 26th November 2013, Mike Ferguson (UK Home Office, CAST) and Laurance Donnelly were invited to meet the Abu Dhabi Navy and Abu Dhabi Coastguard at the Armed Forces, Navy Headquarters, located in Abu Dhabi. The purpose of the meeting was to provide introductory presentations on marine search strategies for missing objects and to demonstrate the use of a diver-

held sonar instrument, the Navigator D38. This instrument is currently restricted for use in the UK for the British military and it is used by the police to search streams, rivers, ponds, lakes reservoirs, seas and estuaries. The sonar instrument was transported to the UAE by Mike Ferguson and was tested by the UAE Navy and Coastguard in a secure marine location.

7.22 SWGGEO meeting, Atlanta, Georgia, USA, November 2013

Members of IUGS-IFG and the Scientific Working Group on Geological Materials (SWGGEO), held a meeting in Atlanta, USA. This was attended by a number of IUGS-IFG members who also serve on the SWGGEO committee including; Jodi Webb, Maureen Bottrell, Elisa Bergslien, Dick Bisbing, Andy Bowen, Brad Lee, Kim Mooney, Bill Schneck, Skip Palenik, Marianne Stam, Ray Murray, Elisa Bergslien and Alastair Ruffell. Continued collaboration between SWGGEO and IFG was recognised to be beneficial for the global advancement and development of forensic geology. The possibility to hold an IUGS-IFG meeting was explored in 2014, to discuss the proposed IUGS-IFG document, 'A Guide to Forensic Geology'.

7.23 International Association of Mathematical Geoscientists (IAMG), December 2013

Throughout 2013, the joint roles of the IUGS-IFG Communications Officer and Executive Vice President of IAMG (2012-2016) have provided Jennifer McKinley the opportunities to promote the applications of Geographic Information Systems (GIS) and special mathematics in forensic geosciences with the UK, Europe Forensic Science Regulators and law enforcement agencies worldwide. This has included the provision of training and the promotion of geoinformatics in forensic geoscience for the Australian Federal Police (AFP), Brazilian Federal Police (BFP) and Russian Federal Centre of Forensic Science (RFCFS).

7.24 Outreach Presentations

Outreach presentations provided by IUGS-IFG which drew attention to forensic geology included the following:

- Geological Society of London, Northwest Regional Group, Manchester University, UK, 28th February 2013;
- Institution of Mining and Metallurgy, Western Branch, Keele University, UK, 4th March 2013;
- Christ the King Roman Catholic School, Burnley, Lancashire, UK, 5th July 2013.
- British Geological Survey, Nottingham, UK, 23rd July 2013; and
- Institution of Mining and Metallurgy, Western Branch, Keele University, UK, 7th October 2013.

8 MAIN PRODUCTS IN 2014

IUGS-IFG's main products in 2014 include the following:

- Training and knowledge transfer courses in UK, Brazil, Russia and UAE.
- Development and growth of the IUGS-IFG web site;
- Finalisation and distribution of the IUGS-IFG flier;
- Finalisation of the IUGS-IFG logo;
- Expansion of the Geoforensic International Network (GIN);

- Planning for the proposed document, '*A Guide to Forensic Geology*' and preparation of draft chapters; and
- Numerous related publications.

8.1 Confidential Documents

IUGS-IFG committee members were regularly engaged in the provisions of advice and operational support to the police and law enforcement throughout 2013. Although this extends beyond the original objectives of the working group, this has resulted in the supply of confidential documents for the police. As such, this information remains confidential as it contains sensitive information of a police or forensic nature.

8.2 Website

The IUGS-IFG web site continues to be based at Buffalo State University, USA, where it is managed by Elisa Bergslien and updated on a regular basis. The web site addresses are:

- forensicgeologyinternational.org
- forensicgeologyinternational.com

8.3 Logo

The final design of the IUGS-IFG logo was agreed on by the committee and has been used throughout 2013 on all official IUGS-IFG documentation (eg. flyers, posters, presentations and training certificates).

8.4 Flier

IUGS-IFG flier was updated at several stages throughout 2013 and issued in both electronic and paper formation at conferences, exhibitions and training events around the world. It is also available on the web site.

8.5 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.

In 2013, new members were included from; Argentina, Hungary, Latvia and Nigeria.

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, 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) (Figure 2).

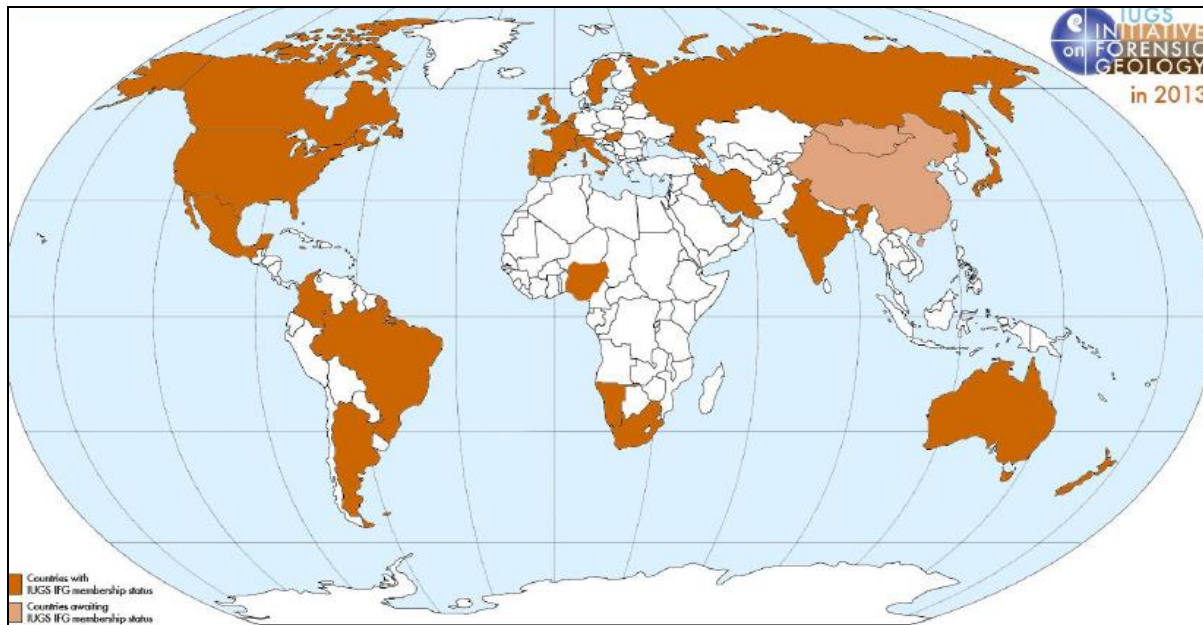


Figure 2. IUGS-IFG, Geoforensic International Network (GIN)

8.6 Certificates

IUGS-IFG certificates were issued to delegates, police officers, law enforcement agents and forensic scientists who attended IUGS-IFG organised events. Examples of the certificates issued are presented in Appendix II.

8.7 Publications

Throughout 2013, peer reviewed books and journals, conference proceedings, abstracts, newspapers, magazines and professional guidance documents were published by members of the group. Where copyright permissions allowed, examples of these publications have been placed on the IUGS-IFG web site. A list of selected publications by IUGS-IFG committee members and others that specifically focus on or include forensic geology are presented in Appendix III.

8.8 Newsletter

IUGS-IFG aims to issue in the early part of 2014 a newsletter in the form of an e-Journal. This will be managed by Jennifer McKinley and the plan is for this to be published at regular intervals to inform the global community of IUGS-IFG events and activities in forensic geology.

8.9 Awards, Accolades and Feedback

Laurance Donnelly was presented with an award by the Russian Federal Centre of Forensic Science (RFCFS) of the Ministry of Justice. This award was presented by Prof Smirnova at the 'First Soil Forensics and Forensic Geology Knowledge Transfer Event' to be held in the Russian Federation and Commonwealth of Independent States (CIS), Moscow, on the 22nd October 2013. The award was given in appreciation of his significant contributions to forensic geology around the world.

Laurance Donnelly was also the recipient of the, 'Geological Society of London (GSL), Forensic Geoscience Group (FGG) Award', in recognition of his pivotal role in global forensic geology and gratitude from the group for initiating its formation.

In May 2013, a letter of support was received from the UK Serious Organised Crime Agency for contributions to the, 'Police Search Advisers (PoISA) Special Interest Seminar on 'Scientific Support to Search'.

9 MAIN PROBLEMS ENCOUNTERED IN 2013

9.1 Principal Leadership Challenge

Funding remains a key challenge for IUGS-IFG. The core funding received each year from IUGS is vital for the global development and advancement of IFG. This funding acted as 'seed money' and attracted additional funding and resources from other international organisations. As such, IFG were able to hold international events in the Brazil, Russia, UAE and UK.

9.2 Competence, Accreditation and Regulation

There remains no internationally approved and recognised organisation for the accreditation and regulation of forensic geologists. This is being considered by IUGS-IFG in association with other organisation and is expected to continue into 2014 and beyond.

10 SUMMARY OF EXPENDITURES IN 2013

10.1 IFG Annual Accounts

The income and expenditure on the account for 2013 is summarised in Table 2.

As the bank account is held in the UK, the income and expenditure is shown in £ sterling and \$USD equivalent. In 2013, IFG was successful in attracting significant additional funding for international events.

As of the **13th December 2013** there is an unspent balance of **£4,819.38**

CREDIT/DEBIT	ITEM	£ (STERLING)	\$ (US DOLLARS)
Credit			
Balance from 2012	Balance carried forward from 2012	1,272.12	2,090.30
IUGS Funding	Transfer of funds from IUGS (USD 15,000)	9,678.12	15,000
TOTAL		10,950.24	17,090.30
Debits & Date			
16 October 2013	R Dixon expenses	641.30	1,053.76
18 October 2013	Internet banking transfer charges for above transaction	15.00	24.65
17 October 2013	Carlos Martin Molina Gallego expenses	702.95	1,155.07
17 October 2013	Internet banking transfer charges for above transaction	15.00	24.65
18 October 2013	Agents Charge	6.34	10.42
18 October 2013	D Khokhlyushkin for translation services October 2013	401.69	660.04
18 October 2013	Agents Charge	6.32	10.38
18 October 2013	Internet banking transfer charges for above transaction	28.00	46.00
04 November 2013	L Olegovna for translation services October 2013	407.80	670.08
04 November 2013	Agents Charge	28.00	46.00
04 November 2013	Internet banking transfer charges for above transaction	6.41	10.53
11 November 2013	A Ruffell and J McKinley expenses	1,864.00	3,062.87
11 November 2013	L Donnelly expenses	543.80	893.56
11 November 2013	IUGS-IFG Committee dinner Moscow	313.00	514.31

20 November 2013	Rosa Maria Di Maggio Expenses	559.54	919.42
21 November 2013	Internet banking transfer charges for above transaction	19.00	31.22
13 December 2013	L Dawson expenses	572.71	941.06
	(exchange differences)		(902.78)
Balance 13.12.13		£4,819.38	\$7,919.06

Please note: Exchange rate used from xe.com 1 USD = 0.608580 GBP 1 GBP = 1.64317 USD

Table 2. Summary of income and expenditure for 2012

10.2 Bank Account

In 2013, the IUGS-IFG bank account was transferred from the National Westminster Bank Plc, in Falmouth, England to the Bank of Scotland, in Aberdeen, Scotland. The IUGS-IFG bank account and is currently managed by Prof Lorna Dawson (IUGS-IFG Treasurer, the Hutton Institute).

11 WORK PLAN FOR NEXT YEAR (2014)

11.1 Principal Objectives

The principal IUGS-IFG objectives for 2014 (subject to confirmation and funding) are currently as follows:

- IUGS-IFG Committee meeting, possibly to be held in the USA to discuss and further develop, 'A Guide to Forensic Geology';
- Knowledge transfer and training events may include a training event with the UK Police and UK National Crime Agency (NCA);
- Collaboration with the Geological Society of London, Forensic Geoscience Group (FGG) and Near Surface Geophysics Group, possibly for a joint meeting in London;
- Several outreach presentations are in the process of being arranged for 2014;
- Collaboration with the Scientific Working Group on Geological Materials (SWGGE0);
- Collaboration with CSIRO and the Centre for Australian Soil Forensics (CAFSS), Australia;
- Collaboration with the European, APST WG (Animal Plant and Soil Traces European Working Group) April 2nd-4th 2014, Rome, Italy;
- Possible IFG participation in the International Association of Forensic Sciences (IAFS) meeting, Seoul, Korea;
- Encouragement of the publication of related papers and articles;
- The production of a regular IUGS-IFG newsletter; and
- The further development of the IUGS-IFG web site.

The above events and activities are to be organised by nominated IUGS-IFG committee members and are to be overseen by the Chair and Vice Chair of IUGS-IFG.

12 CRITICAL MILESTONES

IUGS-IFG critical milestones for 2013 included the following:

- Advancement of forensic geology in Latin America, in collaboration with the Brazilian Federal Police (BFP) and National Institute of Criminalistics (NIC);
- Advancement of forensic geology in Russia and CIS countries, and the first event of its kind ever to be held in the Russian Federation, in collaboration with the Russian Federal Centre of Forensic Science (RFCFS), of the Ministry of Justice of Russia;

- Advancement of forensic geology in the Middle East, in collaboration with the Abu Dhabi Police;
- Introduction of new underwater search technology and strategies for the UAE Navy and UAE Coastguard;
- Advancement of ground search capability within the UK Police, Serious Organised Crime Agency (SOCA);
- Development of the IUGS-IFG web site and flier;
- Expansion of the IUGS-IFG Geoforensic International Network (GIN);
- Outreach events to a variety of audiences including school children, professional geologists, forensic scientists, serving police officers and armed forces; and
- Global publications in the field of forensic geology.

13 ANTICIPATED RESULTS TO BE ACHIEVED FOR 2014

The main results expected for 2014 include the following:

- Expansion and further development of the IUGS-IFG web site;
- Initiation of the first draft of, '*A Guide to Forensic Geology*' and a possible meeting in Atlanta, USA, or at another location (yet to be confirmed);
- Planning for the Forensic Geology session at the 35th International Geological Congress, in Cape Town, South Africa, in 2016; and
- A series of outreach, knowledge transfer and training events in the UK and internationally.

14 BUDGET FOR 2014

IUGS-IFG is planning to host events to develop and promote forensic geology throughout the world. This includes the writing of a document, '*A Guide to Forensic Geology*'. This will be the first of its kind, written by the global forensic geology community and it will provide an authoritative guide for practitioners, academics and those with an interest in the applications of geology to help investigate crime. As such, the IUGS-IFG committee and invited authors aim to hold a meeting in 2014 to plan and develop this document. The meeting may be held in Atlanta, USA, although this is subject to approval by the IUGS-IFG Committee.

Other outreach, knowledge transfer and training events are likely to take place throughout the world during 2014. Funding is required to allow key members of the 'Initiative' to attend the identified meetings and to be able to develop the '*Guide to Forensic Geology*' and to deliver capacity building, knowledge transfer and outreach events.

It is anticipated that the planned training programmes in 2014 should at least break even or generate a small surplus. The requested funding and any surplus generated through training will be used to support the other approved activities of the 'Initiative'. IUGS-IFG will also continue to target specialised companies and organisations for the provision of additional funding, sponsorship and services in-kind.

14.1 IFG Budget request for 2013

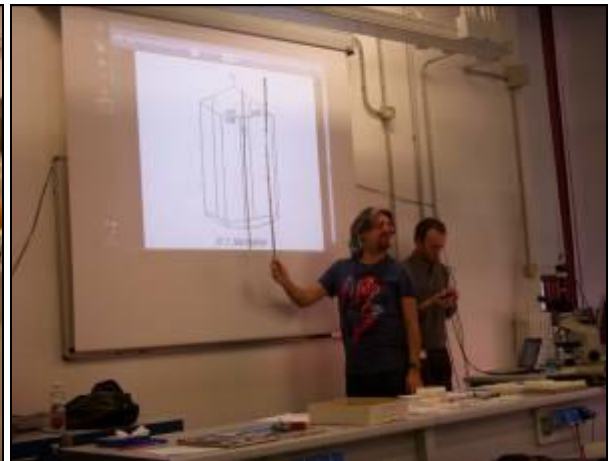
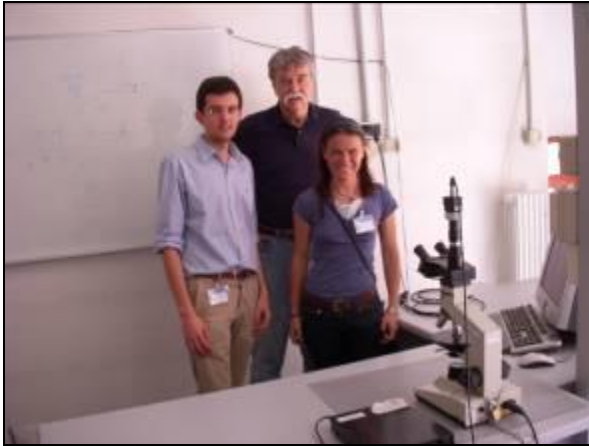
Throughout 2013, IFG was able to attract significant additional financial support to hold international events, above and beyond the core funding provided by IUGS. IUGS-IFG would request that we can 'roll forward' the current balance of **£4,819 or USD\$7,919** to assist with the proposed meetings and events in 2014.

The surplus for 2013 has been generated with thanks to the kind and valuable contributions from the UK Police Serious Organised Crime Agency (SOCA), Brazilian Federal Police (BFP), Russian Federal Centre of Forensic Science (RFCFS), of the Ministry of Justice of Russia, Abu Dhabi Police, organisers of the 2nd International Conference on Engineering Geophysics in the UAE, and the many generous employees and individual companies who have donated in kind staff time and associated expenses; all this kindly provided significant resources to IUGS-IFG for staff time, travel, accommodation and substance.

IUGS-IFG kindly requests the maximum available budget of \$USD 15,000 funding from the IUGS Executive Committee for 2014 to continue to pursue the global development of forensic geology throughout 2014.

APPENDIX I
SELECTED PHOTOGRAPHS

**IUGS-IFG & University of Milan, Training in Geological Trace Evidence:
A Master Class by Skip Palenik, Milan, Italy, May 2013**

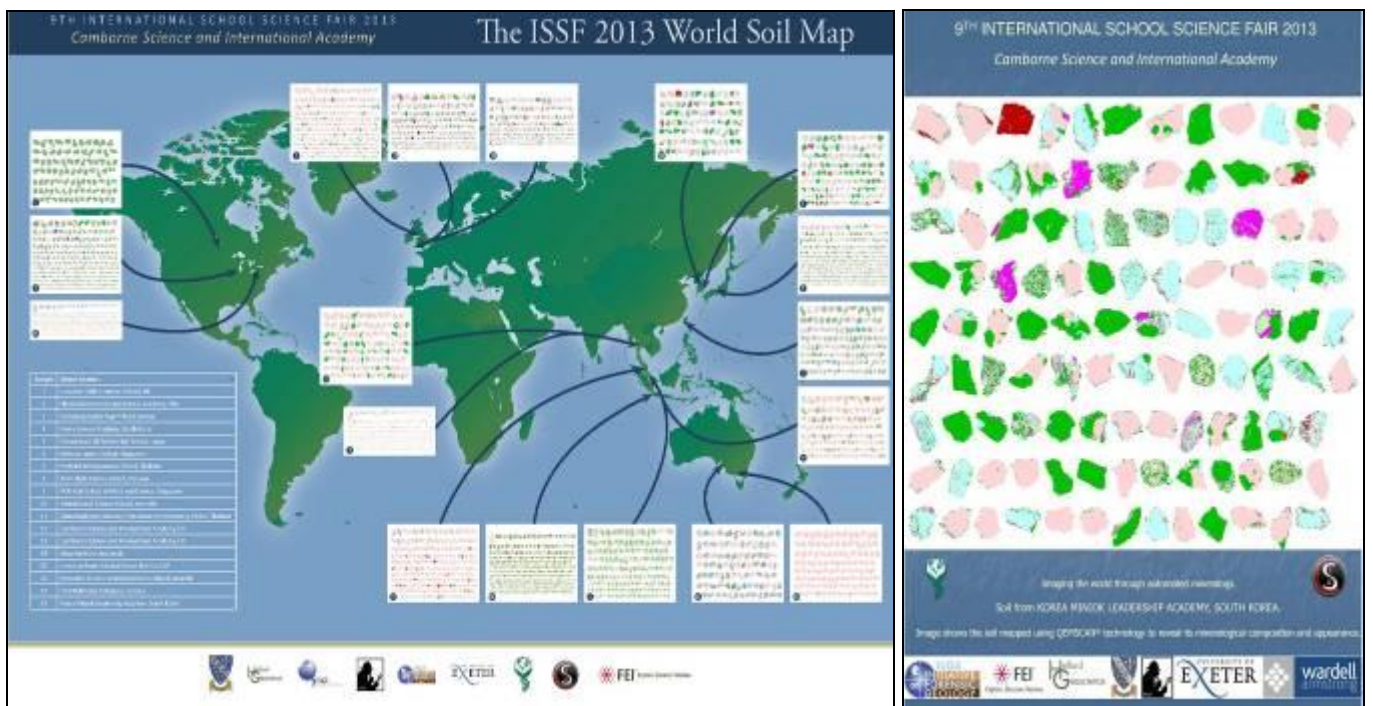


Skip Palenik Master Class, Milan, Italy (photos, Skip Palenik)

IUGS-IFG & The International School Science Fair, Camborne, Cornwall, England, UK, June 2013



Students undergoing training in search and the collection of geological trace (photos Donnelly and Pirrie)



International School Science Fair World Soil Map (after Pirrie et al., 2013)

IUGS-IFG & Brazilian Federal Police Forensic Geology Workshop and Training,
Brasilia, Brazil, October 2013



Forensic geology capacity building and training (photos, Alastair Ruffell, Carlos Molina, BFP)

IUGS-IFG & Russian Federal Centre of Forensic Science (RFCFS), of the Ministry of Justice of Russia,
Moscow, Russia, October 2013



IUGS-IFG & RFCFS conference attendees, Moscow, 22nd October 2013 (photo, RFCFS)



Members of the IUGS-IFG; Jennifer McKinley, Rob Fitzpatrick, Rosa Maria Di Maggio, Lorna Dawson, Alastair Ruffell & Laurance Donnelly outside RFCF headquarters (photo, Donnelly)

IUGS-IFG & 2nd International Conference on Engineering Geophysics, Abu Dhabi Police and UAE Armed Forces (Navy) and UAE Coast Guard, held at Al Ain & Abu Dhabi, UAE, November 2013



2nd International Conference on Engineering Geophysics, knowledge transfer & training with the Abu Dhabi Police, Navy & Coastguard (photos, Donnelly, Abu Dhabi Police and EAGE).

APPENDIX II
EXAMPLE OF IUGS-IFG CERTIFICATES



The International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG)
Acknowledges the support and contributions from

Carlos Martin Molina Gallego

For the organisation and participation in the

Second Iberoamerican Workshop on Forensic Geology & Forensic Geology Training

with the

Brazilian Federal Police

held at

Nacional Institute of Criminalistics (INC), Brasilia, Brazil

Wednesday 2nd to Friday 4th October 2013



Dr Laurance Donnelly
Chair, IUGS-IFG



Prof Rob Fitzpatrick
IUGS-IFG, Vice chair



The International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG)
Acknowledges the support and contributions from

Olga Gradusva

For the organisation and participation in the

First Soil Forensics and Forensic Geology Knowledge Transfer Event

in

The Russian Federation and Commonwealth of Independent States (CIS)

held at

Russian Federal Centre of Forensic Science (RFCFS), Ministry of Justice of Russia, Moscow

Tuesday 22nd October 2013



Dr Laurance Donnelly
Chair, IUGS-IFG



Prof Rob Fitzpatrick
IUGS-IFG, Vice chair



The International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG)
Acknowledges the support and contributions from

Saleh Ali Al Katheeri

For the organisation and participation in the

2nd International Conference on Engineering Geophysics

&

Forensic Geology Training on Ground, Vehicle and Building Searches with the Abu Dhabi Police

held at

United Arab Emirates University, Al Ain and Abu Dhabi Police Headquarters, Abu Dhabi

Arab Emirates (UAE)

Sunday 24th to Thursday 27th November 2013



Dr Laurance Donnelly



Prof Rob Fitzpatrick

APPENDIX III
LIST OF SELECTED PUBLICATIONS IN 2012-2013

The review, compiled by Ritsuko Sugita for INTERPOL contains over approximately 220 articles published in 2010 to 2012 on or including forensic geology. Many of the publications below were taken from the above document.

Books

1. **Bergslien, E. 2012.** An introduction to forensic geoscience. Wiley-Blackwell.
2. **Murray, R. 2014.** Evidence from the Earth (2004). Mountain Press Publishing, USA. This book has been translated and published in China by the Key Laboratory of Evidence Science (China University of Political Science and Law).
3. **Di Maggio, R. M., Matteo Barone, P., Pettinelli, E., Mattei, M., Lauro, S., Banchelli, A. 2014.** Geologia Forense. Introduzione alle geoscienze applicate alle indagini giudiziarie. Italia.
4. **Gradusova, O., Nesterina, E., Peleneva, M. 2014.** Atlas of exotic, anthropogenic and extraneous particles in soil. Russian Federal Centre of Forensic Science, Ministry of Justice, Moscow (in Russian) (pending).
5. **Pirrie, D., Ruffell, A., Dawson, L. 2014.** Environmental Geoforensics. Geological Society of London Special Publication, 384, pp273.

Book Chapters

6. **Donnelly, L. J. 2013.** Use of Geology in Forensic Science: Search to Locate Burials. In: Elias S.A. (ed.) The Encyclopedia of Quaternary Science, Vol. 4 pp. 521-534. Amsterdam: Elsevier.
7. **Donnelly, L. J. 2013.** The Design and Implementation of a High Assurance Forensic Geology and Police Search to Verify Total Gold Recovery Following the Discovery of the Staffordshire (Anglo Saxon) Gold Hoard. In: Pirrie, D., Ruffell, A. R. & Dawson, L. (Eds) (2013). Geological Society of London Special Publication, 384, Criminal & Environmental Forensics (on-line version).
8. **Donnelly, L. J. & Harrison, M. 2013.** Geomorphological and Geoforensic Interpretation of Maps, Aerial Imagery, Conditions of Diggability and the Colour Coded RAG Prioritisation System in Searches for Criminal Burials. In: Pirrie, D., Ruffell, A. R. & Dawson, L. (Eds) (2013). Geological Society of London Special Publication, 384, Criminal & Environmental Forensics (on-line version).
9. **Fitzpatrick, R. W. 2013.** Soil Forensic Analysis. In Wiley, Encyclopedia of Forensic Science. Jamieson, A. & Moenssens, A. A. John Wiley, Chichester, UK.
10. **Fitzpatrick, R. W. 2013.** Chapter 2: Demands on Soil Classification and Soil Survey Strategies: Special-Purpose Soil Classification System for Local Practical Use. In: Shahid, S., A. et al., (Eds). Developments in Soil Classification, Land Use Planning and Policy Implications. Innovative Thinking of Soil Inventory for Land Use Planning and Management of Land Resources. Springer Science & Business Media, Dordrecht.
11. **Murray, R. 2013.** Soils and Sediment. In: Elias S.A. (Ed). The Encyclopedia of Quaternary Science, Vol. 4 pp. 535-541. Amsterdam: Elsevier.

Conference Proceedings and Papers

12. **Barone, P. M., Ferrara, C., Pettinelli, E., Fazzari, A. 2012.** Forensic Geophysics: How the GPR Technique Can Help Forensic Investigations. Book of Abstracts, 6th European Academy of Forensic Science Conference, the 4th International Soil Forensics Conference.

13. **Bergslien, E. 2012.** X-ray diffraction (XRD) and X-ray fluorescence (XRF) analysis of cremated human remains. GAC-MAC, AGC-AMC Joint Annual Meeting.
14. **Bergslien, E. 2012.** Geochemical analysis of cremated human remains. GSA Annual Meeting in Minneapolis, USA.
15. **Breton, H., Forbes, S. L., Carter, D. O. 2012.** Determining the impact of cadaver decomposition on soil microbial communities and potential uses in forensic investigations. Book of Abstracts, 6th European Academy of Forensic Science Conference, the 4th International Soil Forensics Conference 2012.
16. **Dawson, L. A., Jackson, G., Brewer, M. J., Macdonald, L., Morgan, R., M. 2012.** Soil as intelligence and evidence: learning experiences from research and casework. 6th European Academy of Forensic Science Conference, Towards Forensic Science 2, 137.
17. **Dawson, L., Fitzpatrick, R., Donnelly, L. J., Harrison, M., Rolph, A. 2013.** The Use of Soil Provenance in Ground Searches for Burials. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 23 (in English), 24 (in Russian).
18. **Dawson, L., Mayes, B., Ross, J., Engelhardt, I., Jurkevitch, E., Freitag, T. 2013.** The Use of Soil Organic Constituents in Civil and Criminal Investigations. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 27 (in English), 28 (in Russian).
19. **Di Maggio, R. M. 2013.** Soil Forensics in Italy: Historical background and characterization of soil traces evidence. Some case studies. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 33-34 (in English), 35-36 (in Russian).
20. **Donnelly, L. J. 2013.** An Overview of the History and Early Developments of Forensic Geology, the Establishment of the Geological Society of London, Forensic Geoscience Group (FGG) and International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG). IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 8-9 (in English), 10-11 (in Russian).
21. **Donnelly, L. J. 2013.** The Applications of Forensic Geology and Geophysics for Police and Law Enforcement Ground Searches. Second International Conference on Engineering Geophysics, United Arab Emirates University, Al Ain City Municipality, 24-27 November 2013, 82-86, Keynote Presentation.
22. **Donnelly, L. J. 2012.** Determination of a forensic geology and police search strategy to locate shallow burials associated with crime. GAC-MAC, AGC-AMC Joint Annual Meeting, Newfoundland, Canada.
23. **Donnelly, L. J., Grime, M., Harrison, M. 2013.** Interpretation of Victim Recovery Dog (VRD) Responses During Ground Searches for Homicide Graves and the Potential Influences of Geology, Hydrogeology, Peat Stratigraphy and Barometric Pressure Fluctuations. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 16-17 (in English), 18-19 (in Russian).
24. **Donnelly, L. J., Nesterina, E., Gradusva, O. (Eds) 2013.** МИНИСТЕРСТВО ЮСТИЦИИ РОССИЙСКОЙ ФЕДЕРАЦИИ, ФЕДЕРАЛЬНОЕ БЮДЖЕТНОЕ УЧРЕЖДЕНИЕ, РОССИЙСКИЙ ФЕДЕРАЛЬНЫЙ ЦЕНТР СУДЕБНОЙ, КСПЕРТИЗЫ ПРИ МИНИСТЕРСТВЕ ЮСТИЦИИ РОССИЙСКОЙ ФЕДЕРАЦИИ. International Union Of Geological Sciences (IUGS), Initiative On Forensic Geology (IFG) and Russian Federal Centre of Forensic Science (RFCFS), Ministry of Justice, Russia, Present a Knowledge Transfer Event on, Soil Forensics and Forensic Geology, Moscow, 22 October 2013.
25. **Fitzpatrick, R. W., Raven, M., Self, P. 2013.** Reference soil from the road-verge at victim's home as significant evidence in a sexual assault case. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 12-13 (in English), 14-15 (in Russian).

26. **Fitzpatrick, R. W., Raven, M., Self, P. 2012.** Soil as significant evidence in 4 murder investigations involving a wide range of soil types across Australia. Book of Abstracts, 6th European Academy of Forensic Science Conference, the 4th International Soil Forensics Conference.
27. **Forbes, S., L. 2012** Locating buried remains using ground penetrating radar in Canada. GAC, MAC •AGC-AMC Joint Annual Meeting. //gac.esd.mun.ca/gac_2012/search_abs/program.asp
28. **Guedes, A., Ribeiro, H., Valentim, B., Rodrigues, A., Ribeiro, C., Carvalho, Á. 2012.** Desenvolvimento de uma base de dados de solos e sedimentos para fins forenses. Congresso Investigação Criminal.
29. **Hanna, H. D, Bradley, P., J. 2012.** Geochemical analysis of white mica as trace evidence in murder investigations: An overview. 2012 GSA Annual Meeting in Minneapolis.
30. **Kamenov, G., D, Curtis, J., H, Norris, D. 2012.** Geo-referencing a cold case victim with radiogenic and stable isotopes: Little Miss Panasoffkee case study. GSA Annual Meeting in Minneapolis.
31. **Mackinnon, G., Harrison, K., 2012.** Interdisciplinary approaches to the search and location of buried bodies: a United Kingdom context. Book of Abstracts, 6th European Academy of Forensic Science Conference, the 4th International Soil Forensics Conference.
32. **McKinley, J., Ruffell, A., Dawson, L. 2012.** Spatial sampling approaches in forensic geosciences: critique, challenges and case studies. 34th IGC.
33. **McKinley, J., Ruffell, A., Dawson, L., Fitzpatrick, R. 2013.** Databases and Data Management in Forensic Geology and Soil Forensics. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 25 (in English), 26 (in Russian).
34. **Palenik, S. J. 2013.** Modern Trace Evidence Analysis and Its Application to the Forensic Study of Soil, Sand and Dust. Second International Conference on Engineering Geophysics, United Arab Emirates University, Al Ain City Municipality, 24-27 November 2013, 102-105.
35. **Palenik, S. J. 2012.** The role of optical crystallography in forensic trace evidence analysis. GSA Annual Meeting in Minneapolis.
36. **Palenik, S. J. 2013.** Microscopical Technique for the Analysis and Comparison of Soil Traces in Forensic Investigations. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 29-30 (in English), 31-32 (in Russian).
37. **Rēpele, M. 2013.** Forensic Geoscience and Soil Investigation in Latvia. IUGS-IFG RFCFS, Moscow, 22 October 2013, Booklet of Abstracts, 29-30 (in English), 31-32 (in Russian).
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