INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

INITIATIVE ON FORENSIC GEOLOGY (IFG)

ANNUAL REPORT 2014

DR LAURANCE DONNELLY, CHAIR IUGS-IFG
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INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)
INITIATIVE ON FORENSIC GEOLOGY (IFG)

Annual Report 2014

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<td>7.23 22nd ISFS, ANZFSS, Australia, August-September 2014</td>
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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 more 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’. The members of the IFG committee are senior representatives of their respected organisations and include geologists, geoscientists, police officers, forensic scientists and law enforcement agencies.

3.2 Main Approach

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

- **Capacity building:** By raising levels of awareness, knowledge and providing information about forensic geology;
• **Technology transfer**: Through improvement in skill sets; and
• **Outreach**: Educating and informing 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 4.1 and Table 4.1.

![Diagram of IUGS-IFG Committee structure]

**Figure 4.1. The structure of the IUGS-IFG Committee in 2014**
<table>
<thead>
<tr>
<th>POSITION</th>
<th>NAME</th>
<th>COUNTRY</th>
<th>AFFILIATION</th>
<th>EMAIL</th>
</tr>
</thead>
<tbody>
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<td>CSIRO</td>
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<td></td>
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<td>Lt.Saleh Ali Al Katheeri</td>
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<td></td>
<td></td>
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<td>Officer, Japan and Asia</td>
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<td>National Research Institute of Police Science, Japan</td>
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<td>University of Technology, Sydney</td>
<td><a href="mailto:shari.forbes@uts.edu.au">shari.forbes@uts.edu.au</a></td>
</tr>
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<td>Officer, Canada</td>
<td>Prof Grant Wach</td>
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<td>Dalhousie University, Nova Scotia, Canada</td>
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</tr>
<tr>
<td>Officer, Africa</td>
<td>Dr Roger Dixon</td>
<td>South Africa</td>
<td>University of Pretoria (Formerly, Forensic Science Laboratory, South African Police Service)</td>
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</tr>
</tbody>
</table>

Table 4.1. IUGS-IFG committee members in 2014 and their professional affiliations
4.1 IFG Committee Changes
There were no changes to the IUGS-IFG Committee in 2014.

5 EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS
During 2014 support for IUGS-IFG was provided by individual committee members and their respective employers/organisations. The in-kind value of this support is considerable. IFG has estimated that the Committee Officers have provided at least 155 person days in the last year attending IFG conferences and training courses, the provision of outreach events and the management of the Initiative.

The value of this in-kind support is difficult to quantify, however a commercial value to the time spent on the IFG in 2014 would be in excess of approximately USD($)87,500

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 approximately USD ($)27,600

5.1 Acknowledgements
Throughout 2014, IUGS-IFG received support from numerous organisations, which include the following:

- **IUGS Executive Committee**
- IFG would also like to express gratitude to Peter Bobrowsky, for his support and encouragement for the global development and advancement of forensic geology, and assisting and representing IFG at the IUGS Committee meeting in India.

- **Commercial companies**: Wardell Armstrong International (UK), WorleyParsons, Helford Geoscience LLP (UK), Microtrace LLC (USA), James Hutton Limited and Geoscienze Forensi Italia (Italy).

- **Police, law enforcement and government agencies**: California Department of Justice, Federal Bureau of Investigation (USA), Australian Federal Police (Australia), Washington State Patrol Crime Lab (USA), Abu Dhabi Police (UAE), Russian Federal Centre of Forensic Science (RFCF) 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), Interpol (Europe), Home Office Centre for Applied and Scientific Research (CAST) (UK), Greater Manchester Police (GMP) (UK), Leicestershire Police (UK), West Yorkshire Police (UK), Cambridgeshire Police (UK), Police Scotland, Inspector Graham Peffers (GMP), Inspector Colin Hope (NCA) and Mike Ferguson (CAST).

- **Universities and research institutes**: University of Pretoria (South Africa), Dalhousie University (Canada), 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), University of Keele Department of Earth Sciences (UK), University College London (UK), University of Pretoria (South Africa), Nacional Institute of Criminalistics (INC) (Brazil), Instituto Nacional de Medicina Legal y Ciencias Forense (Colombia), Australian and New Zealand Forensic Science Society (ANZFSS), Department of Biological and Chemical Investigations State Forensic Science Bureau, The
6 INTERACTION WITH OTHER INTERNATIONAL PROJECTS

Throughout 2014, IUGS-IFG interacted and collaborated with the organisations and projects listed in Table 6.1.

<table>
<thead>
<tr>
<th>ORGANISATION</th>
<th>PROJECT</th>
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<tbody>
<tr>
<td>Geological Society of London, Forensic Geoscience Group (FGG)</td>
<td>Future Horizons</td>
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<td>Geological Society of London, Western Regional Group</td>
<td>Forensic Geology</td>
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<td>Geological Society of London</td>
<td>Communication in Geology</td>
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<td>Geologists Association</td>
<td>Festival of Geology</td>
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<tr>
<td>University of Technology Sydney and Victoria Police</td>
<td>Training in Forensic Geology</td>
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<tr>
<td>Victorian Institute of Forensic Medicine</td>
<td>Training in Forensic Geology</td>
</tr>
<tr>
<td>CSIRO/CAFSS, Australia</td>
<td>Crime scene protocols</td>
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<td>UK National Crime Agency (NCA)</td>
<td>Victim Recovery Dog &amp; PolSA workshop</td>
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<td>Bath Geological Society</td>
<td>Forensic Geology</td>
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<tr>
<td>Abu Dhabi Police</td>
<td>Geological advice</td>
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<td>Channel Islands Group of Professional Engineers</td>
<td>Forensic Geology</td>
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<td>Earth Science Teachers Association</td>
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<td>The International Network of Environmental Forensics</td>
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<td>INTERPOL, France</td>
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<td>New Course in Forensic Geology</td>
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<td>Military and war grave searches, Ukraine</td>
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<td>Institute of Forensic Science, China</td>
<td>Forensic Geology</td>
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<td>Second World War, Military Geology, Belarus</td>
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<td>The Disappeared, Northern Ireland</td>
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<td>Search for shallow graves, UK</td>
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<td>Australian and New Zealand Forensic Science Society (ANZFSS)</td>
<td>Geological (trace) evidence and search</td>
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<tr>
<td>International Association of Mathematical Geoscientists (IAMG)</td>
<td>Forensic Geology</td>
</tr>
<tr>
<td>Assistance to 4 UK Police Forces (Confidential)</td>
<td>Search for unmarked homicide graves</td>
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<tr>
<td>School of Criminology (University of Ulster, Northern Ireland)</td>
<td>Geological (trace) evidence and search</td>
</tr>
</tbody>
</table>

Table 6.1. Selected examples of IUGS-IFG collaboration in 2014
7 CHIEF ACCOMPLISHMENTS FOR 2014

7.1 Main objectives for 2014
The main objectives for 2014, as determined by the IFG Committee in 2013, were to:

- Hold the IUGS-IFG Committee meeting, possibly to be held in the USA, to discuss and further develop, ‘A Guide to Forensic Geology’;
- Host Knowledge Transfer and training events, which 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;
- Deliver several outreach presentations;
- Collaborate with the Scientific Working Group on Geological Materials (SWGGEO);
- Collaborate with CSIRO and the Centre for Australian Soil Forensics (CAFSS), Australia;
- Collaborate with the European, ENFSI APST WG (Animal Plant and Soil Traces European Working Group) April 2nd-4th 2014, Rome, Italy;
- Participate in the IFG International Association of Forensic Sciences (IAFS) meeting, Soul, Korea;
- Encourage the publication of related papers and articles;
- Produce of a regular IUGS-IFG newsletter; and
- Further develop the IUGS-IFG web site.

During 2014, IUGS-IFG contributed to and completed the following capacity building, technology transfer and outreach events, which are summarised below in chronological order.

7.2 Advice on the Search for the grave site of Genghis Khan, Mongolia, January 2014
IUGS-IFG was invited to review a research paper and he provided UK based advice on ground search strategies to potentially locate the grave/burial site of Genghis Khan (Confidential).

7.3 IUGS 67th Executive Committee Meeting, Goa, India, February 2014
On 8th-10th February 2014, IFG provided a presentation on forensic geology and an overview of the work of IFG, which was delivered by Peter Bobrowsky to the IUGS Executive Committee in India. IFG was encouraged by the feedback to continue the good work in developing and promoting forensic geology around the world.

7.4 Forensic Geology, AAFS, Atlanta, Georgia, USA, February 2014
In February 2014, ten instructors, including three members of the IUGS-IFG Committee (Marianne Stam, Christopher Palenik and Ray Murray) gave a workshop on forensic geology/soils at the American Academy of Forensic Sciences (AAFS) meeting in Atlanta, Georgia, USA. The attendees were very complimentary about the workshop, and some provided feedback and stated that it was, ‘the best workshop they had ever attended’. The workshop was organized to be a practical approach to the collection and analysis of soil/geological evidence in a crime laboratory. The first day was largely filled with lectures/presentations and the second day included practical work using microscopy. Attendees were also given a crime scenario, instrumental data (such as provide through XRD analysis), and geological/soil evidence samples and they had to determine what was in the soil samples and where the samples might have come from. In addition to Americans, there were attendees from Italy as well as Paraguay. Attendees were from various professions including forensic scientists, university professors, physical anthropologists, and a botanist specializing in the DNA analysis of plant material.
7.5 Provenance of Beach Sand, United Arab Emirates, February 2014
IUGS-IFG (Laurance Donnelly) provided geological advice to help determine the type and origin of beach sand in association with an ongoing investigation (confidential).

7.6 Location of a War Grave, Ukraine, February 2014
In 2010 Laurance Donnelly provided UK based advice to assist a search to locate the presence of a mass grave relating to World War II, which was believed to be located in the Ukraine. In February 2014, Laurance was further contacted and invited to become a team member to assist with the search for this mass grave, and to support the Ukrainian geophysicists. This included the assessment of aerial photography, accounts and provision of intelligence and the design of the geophysical surveys. A site visit did was postponed take place due to operational constraints.

7.7 Search for Missing Persons, Europe, February-June 2014
IUGS-IFG provided advice and associated analyses to develop a ground search strategy for missing persons in Europe (confidential and ongoing). We contributed to the training in methods of sample collection and analyses to the European labs that assisted in the search.

7.8 Search for Missing Person, Europe, 2014
IUGS-IFG conducted a desk study, produced a conceptual geological model and assisted in the design of a ground search strategy for a potential grave in Europe (confidential).

7.9 Geological Society of London, Careers Day, Manchester, UK, March 2014
On 5th March 2014, Laurance Donnelly supported the Geological Society of London, Northwest Region Group, Careers Day, which was held at the University of Manchester. The event was attended by several hundred delegates and representative from academia, industry and consultancy. Laurance was invited to deliver a presentation on ‘careers in geology’ and how geologists can support forensic, police and law enforcement investigations.

7.10 Location & Recovery of Murder Victim’s Remains, Belfast, Northern Ireland, March 2014
On 26th March 2014, organised by members of the IUGS-IFG the Head of the ‘Independent Commission for the Location & Recovery of Victim’s Remains’ gave a seminar at Queen’s University, Belfast, on the work of the ‘Commission’. This was delivered to students studying a Level 3 module ‘Geoforensics’ and other members of the University.

7.11 IUGS-IFG Newsletter, April 2014
In April 2014, the first IUGS-IFG newsletter was finalised, approved, published and issued globally.

7.12 Fiction and Forensic Geology, London, UK, April 2104
In April 2014, IUGS-IFG was approached by The Geological Society of London, to assist with the writing and publication of a fiction novel on forensic geology. Laurance Donnelly provided the authors with an overview of the role of a forensic geologist. The publication of this book was projected estimated to be in 2015-2016. Lorna Dawson has contributed material to several crime authors and these communications have resulted in the integration of realistic soil forensic story lines (Stuart MacBride, Ann Cleeves and Mark Billingham).

7.13 Geoforensics, School of Criminology, University of Ulster, Northern Ireland, May 2014
On 2nd May 2014, Alastair Ruffell delivered a seminar to the School of Criminology (University of Ulster, Northern Ireland) on Geoforensics, coordinated by Rachel Monaghan, Senior Lecturer in Criminology.
7.14 Counter Terrorism, Search Training, USA, May 2014
Following on from the ground search and counter terrorism knowledge transfer and search training held in UEA, in 2014, a member of the IUGS-IFG Geoforesenic International Network, who is also a serving UK Police Officer, visited eastern USA to provide training in counter terrorism search techniques and strategies.

7.15 Geological Society of Japan, May 2014
On 24th May 2014, approximately 86 delegates attended a Geological Society of Japan (GSJ) event, which included approximately 20% that were non GSJ affiliated. Ritsuko Sugita attended and promoted the interests of IUGS-IFG.

7.16 Communicating Contested Geoscience, London, UK, June 2014
IUGS-IFG participated in a one day conference that focussed on ‘communication’, entitled ‘Communicating Contested Geoscience, New Strategies for Public Engagement’, which was held at the Geological Society of London. Geological issues are increasingly intruding on the everyday lives of people across the UK and in other parts of the world. Communicating geology to fellow geologists, non-geological professionals, forensic scientists, police officers, law enforcement agents, the public and the media, can be challenging. This event highlighted the need for developing better communication in geosciences and focused on strategies to assist geoscientists. This conference was a forum that brought together geoscientists from universities, industry and government together with specialists in communication and public engagement to explore the challenges of communicating contested geological issues to the wider public. IUGS-IFG attended and contributed to this event by providing examples of how clear and effective communication took place between forensic geologists and the police.

7.17 Oxford Geology Group & Thames Valley Police, UK, July 2014
On 3rd July 2014, IUGS-IFG (Laurance Donnelly) delivered a presentation to the Oxford Geology Group to outline the applications of geology to policing and law enforcement. The event was attended by approximately 50 delegates, including undergraduate students, professional geologists and Thames Valley Police. As a result of this presentation more specific information on forensic geology was requested, and supplied, to officers working in the Forensic Laboratory, of Thames Valley Police.

7.18 The Geological Society of London, Western Regional Group, Bristol, UK, July 2014
On 15th July 2014, IUGS-IFG delivered a knowledge transfer presentation on forensic geology to the Geological Society of London, Western Regional Group, at the offices of Atkins, in Bath, Gloucestershire. The event was attended by approximately 30 geologists and engineers interested in the applications of forensic geology to criminal, environmental and geotechnical investigations.

7.19 Search for a Homicide Grave, UK, August 2014
IUGS-IFG provided the Police with guidance, advice, and a search strategy for a cold case to help locate a homicide grave. This case also provided the group with the opportunity to collaborate and take soil samples from the grave to better understand the generation of leachate and volatile organic compounds (VOCs) for potential future application in open area ground searches.

7.20 Forensic Geology in Latvia, August 2014
Following on from discussions held at the European, APST WG (Animal Plant and Soil Traces European Working Group) on April 2nd-4th 2014, Rome, Italy (Lorna Dawson) and in August, IUGS-IFG held preliminary discussions with Māra Répele regarding the possibility to hold a forensic
geology event in Latvia, during 2015 or 2016, with the Latvia Department of Biological and Chemical Investigations, State Forensic Science Bureau.

7.21 Radiocarbon and Geoforensics, Queens University Belfast, Northern Ireland, August 2014

7.22 Postgraduate Course in Forensic Geology, University of Messina, Sicily, May-August 2014
In May 2014, Roberta Somma, Rosa Maria Di Maggio, Laurance Donnelly and Lorna Dawson began the planning for the, ‘First Level Postgraduate Master Specialisation Course in Forensic Geology’. This was the first course of its kind in Italy and has the support of the Italian Police/Carabinieri. This course was endorsed and supported by IUGS-IFG, by the provision of the following:

- Guidance and advice on course content;
- Inclusion of the IUGS-IFG Chair on the scientific committee of the postgraduate course;
- Inclusion of IUGS-IFG in official course documentation;
- Provision of seminars and training in forensic geology, including ground searches and geological trace evidence (soils).
- IUGS-IFG support with promotion of the course and inclusion on the IUGS-IFG web site and contributions to media interviews.

In August 2014, the Academic Senate, at the University of Messina, formally established the Masters course in Forensic Geology, which is expected to begin in early 2015.

7.23 22nd ISFS, ANZFSS, Australia, August-September 2014
The 22nd International Symposium on the Forensic Sciences (ISFS) conference, of the Australian and New Zealand Forensic Science Society (ANZFSS), was held from 31st August to 4th September 2014, in Adelaide, Australia. Rob Fitzpatrick presented a keynote entitled, ‘Mineralogical and Pedological Comparisons of Secondary and Primary Transfer Soil Samples as Significant Evidence in a Criminal Investigation’ and Ruth Morgan presented on, ‘The ‘Chain of Evidence; A Critical Appraisal of the Applicability and Validity of Forensic Research and the Usability of Forensic Evidence’. This event included an inspection of the CAFSS laboratory in Adelaide. Shari Forbes and her research team presented six talks relating to the use of cadaver-detection and blood-detection canines as search tools and methods for enhancing their training and accuracy.

7.24 Forensic Geology, Discovery Channel, Colombia, September 2014
On 12th September 2014, Carlos Molina Gallego was interviewed by the Discovery Channel’s, ‘Daily Planet’ programme, entitled ‘Finding the Disappeared’, which was based on the work and research undertaken by IFG and Carlos applying forensic geology to locate victims of crime.

7.25 Forensic Geology Postcard, IUGS, September 2014
IFG provided IUGS with a series of images portraying typical forensic geology scenes for usage in the development of marketing materials and a forensic geology postcard.

7.26 Training to Locate Buried and Concealed Evidence, Victoria Police, Australia, October 2014
On 15th-17th October 2014 Shari Forbes provided training to the Victoria Police Crime Scene Unit and Homicide Detectives Unit. Information on search, including a power point presentation, was provided by Laurance Donnelly, which included; the history and development of ground searches,
development of a conceptual geological model, diggability, choice of search assets (such as geophysics and victim detector dogs) and search strategies and methodologies. Shari delivered the training in conjunction with Dr Soren Blau (Victorian Institute of Forensic Medicine) and Jon Sterenberg (Consultant Archaeologist). The training involved one day of lectures and two days of practical exercises including search techniques, use of geophysical equipment and archaeological recovery techniques. The workshop received overwhelmingly positive feedback with the request to repeat the training in coming years for additional crime scene and homicide detective personnel. This opportunity followed on from the training in ground search organised by Laurance Donnelly and Mark Harrison, to the Australian Federal Police, in Brisbane, in August 2012.

7.27 Forensic Geology, IAFS, Korea, October 2014
On 12th-18th October 2014, IUGS-IFG participated in the International Association of Forensic Science (IAFS) conference in Seoul, Korea, to promote and develop forensic geology throughout Asia. A poster was compiled by Laurance Donnelly and Ritsuko Sugita and Laurance Donnelly, and the event was attended by Ritsuko and Christopher Palenik. This attracted considerable interest in forensic geology. As a result, IUGS-IFG proposes to consider a forensic geology knowledge exchange and capacity building event in Japan, in 2015/2016.

7.28 Search for ‘Service Men Missing in Action’, Belarus, October 2014
In October 2014, IUGS-IFG (Laurance Donnelly) provided UK based advice and guidance on techniques and strategies potentially deployable to assist with the search to locate sites of servicemen in Belarus, who are believed to be ‘missing in action’, from World War II, including partisans, and prisoners-of-war.

7.29 Search for a Homicide Grave, October, Northern England, UK, 2014
In October 2014, IUGS-IFG conducted reconnaissance geological inspections for a search area in a remote, upland part of northern England to consider the potential for the generation of leachate from a suspected homicide grave. This resulted in the preliminary and conceptual development of a ground water model and soil sampling strategy to detect leachate and volatile organic compounds (VOCs). This was aimed at reducing the search area for the deployment of a ground based search, using geophysical surveys and victim detector dogs, this research and search is ongoing (confidential).

7.30 Institute of Forensic Science, China, October to November 2014
From 31st October to 4th November 2014, Ray Murray was invited to visit the Institute of Forensic Science, in China to speak at an international symposium on Forensic Science, in Guangzhou and Beijing. This provided a unique opportunity to acquaint forensic scientists in China with IUGS-IFG and provide information about forensic geology in China to our members and the geology and police professions.

7.31 Earth Science Teachers Association (ESTA), London, UK, November 2014
Laurance Donnelly was invited to present to the ESTA on; ‘The Applications of Forensic Geology to Police Investigations’. However, this event was rearranged and will take place in 2015 at a date to be determined.

7.32 Geologists’ Association Festival of Geology, London, UK, November 2014
On 1st November 2014 a ‘Festival of Geology’ was held at University College London (UCL), in association with IUGS-IFG and the Geological Society of London, Forensic Geosciences Group (FGG). This included exhibitors from the world of geology and specially invited guest speakers. The event attracted over 1,500 professional and amateur geologists, and school children. The guest speakers
included Laurance Donnelly who presented to over 250 delegates. There was considerable interest in forensic geology from members of the public, retired professionals, younger geologists and school children.

7.33 Channel Island Group of Professional Engineers (CIGPE), Channel Islands, November 2014
IUGS-IFG (Laurance Donnelly) established an opportunity to deliver a series of presentations to CIGPE on, ‘The Applications of Geology to Police, Forensic and Criminal Investigations’. The presentations were delivered by Alastair Ruffell from 19th to 21st November 2014, on the islands of Guernsey and Jersey. These presentations were given to school students aged 12-18, CIGPE members and interviews were provided.

7.34 Kuwait Police Officer Training, UK, November 2014
Following on from the 2nd International Conference on Engineering Geophysics, Al Ain, UAE in 2013 and the associated knowledge transfer and training provided by IUGS-IFG to the Abu Dhabi Police, in November 2014, a serving police officer from Kuwait visited the UK to complete formal training course in search.

7.35 Tribal Grave Location, Mauritania, (WIMM), Stoke-on-Trent, UK, November 2014
In November 2014, a presentation was delivered to the Western Institute of Mining and Minerals (WIMM), at the University of Keele, Department of Geology, on work conducted to locate and verify the presence of tribal graves in Mauritania. These graves were found during works to develop and expand a gold mine. The original engineering work was conducted by Christine Blackmore (Wardell Armstrong International) and the forensic geology by Laurance Donnelly. The presentation was designed by Laurance and Christine, and delivered by Christine.

7.36 Human Taphonomy and Burial Research Consortium, Australia, November 2014
On 28th November, Shari Forbes presented an invited lecture to members of the Burial Research Consortium and invited police guests on how to establish a human taphonomy facility in the UK. This request followed the recent announcement of the development of such a facility in Australia. The facility will be used for forensic geology research including soil (trace) evidence and search techniques. Australia’s facility is scheduled to open in 2015 and is the first facility of its kind outside of the USA.

7.37 Recent Work in Archaeological Geophysics, UK, December, 2014
On 3rd/2nd December 2014, IUGS-IFG and The Geological Society of London, Forensic Geosciences Group, held a one-day conference entitled, ‘Forensic Geoscience: Future Horizons’. This multidisciplinary meeting captured shared interests between; the geological, environmental science, forensic science, geophysics, engineering, geotechnical, mining and archaeological communities for the assessment of the potential increased application of forensic geoscience in the future. The sessions included: quality assurance in forensic geoscience, geoforensic applications in serious crime and terrorism investigations, techniques at crime scenes, environmental crime, and the issues of the interpretation of geological trace evidence. The conference was attended by delegates from more than 10 nations and by police and forensic practitioners. A special publication has been produced from this event and a pdf of the book will be placed on the IUGS IFG web site (edited by Ruth Morgan (FGG) and Lorna Dawson (IFG)).

7.38 Future Horizons, UK, December, 2014
On 2nd December 2014, IUGS-IFG and The Geological Society of London, Forensic Geosciences Group, held a one-day conference entitled, ‘Future Horizons’. This multidisciplinary meeting captured shared interests between; the geological, environmental science, forensic science,
geophysics, engineering, geotechnical, mining and archaeological communities for the assessment of the potential increased application of forensic geoscience in the future. The sessions included: quality assurance in forensic geoscience, geoforensic applications in serious crime and terrorism investigations, techniques at crime scenes, environmental crime, and the issues of the interpretation of geological trace evidence. A special publication has been produced from this event and a pdf of the conference proceedings will be placed on the IUGS-IFG web site.

7.39 IUGS, IFG Strategy Meeting and Annual General Meeting, UK, December 2014
IUGS-IFG, held its 3rd Strategy Meeting and AGM in London, at the Geological Society headquarters, on 4th-5th December 2014. The items discussed at this meeting included the following:

- Plans for the publication of, ‘A Guide to Forensic Geology’;
- Geoforensic International Network (GIN);
- Regulation & accreditation;
- Report from Treasurer and FGG finances;
- Collaboration with the other IUGS working groups;
- Training & publications;
- Web site;
- IFG planning for 2015;
- Forensic Geology, University of Messina
- Forensic Geology, Latvia 2015; and
- IGS2016 in Cape Town;

7.40 Bath Geological Society, UK, December 2014
A forensic geology event and presentation was scheduled to take place with the Bath Geological Society on 4th December 2015, but this has now been rescheduled to take place in 2015.

7.41 Geoinformatics in Forensic Geology with IAMG, December 2014
A strong link with the IAMG (Jennifer McKinley is Executive Vice President of the IAMG), has provided opportunities to develop the appropriate and robust use of spatial statistics, geoinformatics and Geographical Information Science (GIS) in Forensic Geology.

7.42 Outreach Events
Forensic geology outreach events were held in 2014 are presented in Appendix I.

8 MAIN PRODUCTS IN 2014
IUGS-IFG’s main output products in 2014 include the following:

- Training and knowledge transfer courses in UK, Australia and USA;
- Development of material for the first Italian course on Forensic Geology in Messina, Sicily;
- Publication and distribution of the first Forensic Geology newsletter;
- Update and distribution of the IUGS-IFG flier, in both paper and electronic format;
- Expansion of the Geoforensic International Network (GIN) globally;
- Publication of several scientific papers in peer reviewed journals, conference proceedings, popular press articles; and
- Selected interviews with the media;
- Contributions to various case work investigations, as intelligence and evidence.

8.1 Confidential Documents
Consistent with 2013, some IUGS-IFG committee members continued to become regularly engaged in the provision of advice and operational support to the police, security and law enforcement agencies, throughout 2014. This resulted in confidential information and the production of documents on, or that included, forensic geology to assist with criminal investigations. Although this extends beyond the objectives and scope of IUGS-IFG, our committee members were able to offer professional support and advice, and call upon the wider network developed within the IUGS IFG, where appropriate. Due to the restricted and protected nature of this information, these confidential reports and statements cannot be supplied as part of the annual report or placed on the IUGS-IFG web site.

8.2 Website
Elisa Bergslien, Buffalo State University, USA continues to manage and update the IUGS-IFG website. The web site addresses are:

- forensicgeologyinternational.org;
- forensicgeologyinternational.com.

8.3 Logos
The IUGS-IFG logos have been endorsed by the committee and continue to be used on official IUGS-IFG documentation (eg. flyers, posters, presentations and training certificates) (Figure 8.1).

8.4 Flyer
IUGS-IFG flyer was updated at several stages throughout 2014 and issued in both electronic and paper formation at conferences, exhibitions and training events around the world. It is also available on the IUGS-IFG 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 2014, there was significant interest from the public, academics and students to become affiliated to GIN. Although this exceeded the original idea of GIN, membership was halted pending the IUGS-IFG Annual Meeting (held in London, December 2014) so that the future organisation and management of GIN, and its possible expansion, can be discussed and determine.
In 2013-2014, IUGS-IFG was contacted with potential new members from Belarus, China, Kazakhstan, Kyrgyzstan, Kuwait, Mongolia, Oman, Qatar, Poland and Venezuela. It is expected these members may become affiliated to GIN in 2015/2016.

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 8.2).

![Figure 8.2 IUGS-IFG, Geoforensic International Network (GIN)](image)

8.6 Certificates
IUGS-IFG certificates were issued to delegates, police officers, law enforcement agents and forensic scientists who attended IUGS-IFG organised events.

8.7 Publications & Newsletter
A Selection of publications for 2014 is provided in Appendix I.

IUGS-IFG published the first newsletter in Forensic Geology, which was issued and circulated globally in April 2014. IUGS-IFG expects to produce a second newsletter in the early part of 2015.

8.8 Journal of Forensic Geology
IUGS-IFG was approached by a publisher to consider the production of a ‘Journal of Forensic Geology’. This opportunity will be discussed and considered at the IUGS-IFG Annual General Meeting and Strategy Meeting, in December 2014.

9 MAIN PROBLEMS ENCOUNTERED IN 2014

9.1 Funding: A Principal Leadership Challenge
The availability of funding is one of the most significant challenges which face IUGS-IFG. The funding received from IUGS is crucial to enable and sustain the development and promotion of Forensic
Global Geology. This funding can act as a catalyst to attract additional funding or services in kind, from committee members, their respective organisations and stake-holders.

9.2 Publications
IUGS-IFG received multiple approaches from international publishers for the publication of books, papers and articles in forensic geology, some with unrealistic and unachievable timeframes. The priority of the IUGS-IFGs priority is to first publish, ‘A Guide to Forensic Geology’ and some of the approaches from publishers may then be subsequently considered.

9.3 Competence, Accreditation, Regulation and Code of Conduct
IUGS-IFG is considering competence and ethics in Forensic Geology and has recognised the need for the global regulation and accreditation in Forensic Geology, above and beyond which already exists in related professional organisations. This will remain one of the key areas to be further considered by IUGS-IFG in the years ahead.

9.4 Communication
Effective communications between Forensic Geologists and non-geological specialists, the police/law enforcement officers, public and media remains challenging. IUGS-IFG are to focus on the provision of advice and guidance to assist Forensic Geologists to communicate more clearly. This includes written and oral forms of communication, the provision of interviews to the media, police, lawyers, engaging with the public and family liaison teams, and giving evidence in court. Selected images are provided in Appendix 2.

9.5 Security
Increased security risks in some countries have precluded the in-country involvement of IUGS-IFG and some associated visits. The IUGS-IFG remains vigilant and does not promote or attend any events or activities in those parts of the world that are considered to be high risk.

10 SUMMARY OF EXPENDITURES IN 2014

10.1 Bank Account
The IUGS-IFG bank account is based in Aberdeen, Scotland, and is managed by Prof Lorna Dawson (IUGS-IFG Treasurer, The James Hutton Institute).

10.2 IFG Annual Accounts
The income and expenditure on the account for 2014 is summarised in Table 10.1.

As the bank account is held in the UK, the income and expenditure is shown in £ sterling and $USD equivalent. In 2014, IFG was successful in attracting additional funding for international events.

<table>
<thead>
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<th>CREDIT/DEBIT</th>
<th>ITEM</th>
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<td>IUGS Funding</td>
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<tr>
<td>Italy (2015) (allocated)</td>
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</tr>
</tbody>
</table>
11 WORK PLAN FOR NEXT YEAR (2015)

11.1 Principal Objectives
The principal objectives for 2015 (subject to confirmation and funding) are currently as follows:

- Complete writing and issue to the IUGS-IFG Committee a preliminary draft of, ‘A Guide to Forensic Geology’;
- Provide support, advice and guidance for the first Italian MSc in Forensic Geology, University of Messina, Sicily, Italy, 14\textsuperscript{th} to 25\textsuperscript{th} September 2015;
- Plan for the Forensic Geology session, of the 36\textsuperscript{th} International Geological Congress (IGC), in Cape Town, South Africa in 2016;
- IUGS-IFG Involvement in NI Science Week Thursday 19th February to Sunday 1st March 2015;
- Thursday 19th February 2015 Public outreach event (Jennifer McKinley and Alastair Ruffell) ‘How Volcanoes can solve crime’ in association with the Geological Society London Forensic Geoscience Specialist Group, and Geological Society ‘Year of Mud’ supported by the NI Regional Geological Society group;
- Training in forensic geology, in Halifax (GW, AR, SF), April 2015:
- ENSFI meeting, April 2015:
- EAFS meeting, Prague, 6th-11th September 2015:
- Advancement of the potential for the detection of VOC and leachate from homicide graves;
- Join and support the technical committee of the 3rd edition of the International Conference on Engineering Geophysics (ICEG), to be held from 15th-18th November 2015 in Al Ain, UAE;
- Potentially organise training in geological (trace) evidence in the USA;
- Provide training and support in ground searches for burials and evidence, for UK Police;
- Potentially organise a Forensic Geology knowledge transfer and capacity building event in Japan, 11th-13th September 2015
- Potentially organise a Forensic Geology outreach and knowledge transfer event in Latvia and/or Belarus;
- Planned event with International Association of Mathematical Geoscientist (IAMG), for the Northern Ireland Science Week, on 19th February 2015;
- Encouragement of the publication of related papers and articles;
- Produce the 2015 IUGS-IFG newsletter;
- Contribute to the MiSAFE project final meeting at Interpol, France
- Prof Arpad Vass to possibly visit the UK
- British Science Festival, Bradford UK, September 2015
- Develop and expand the Geoforensic International Network (GIN) and,
- Further develop the IUGS-IFG web site.

12 CRITICAL MILESTONES

IUGS-IFG critical milestones for 2014 included the following:

• Establishment of a new course in Forensic Geology in Italy;
• Development of forensic geology as a discipline in China;
• Provide outreach to the public, school children, students and media;
• Provision of operational support to serious criminal investigations; and,
• Development of marketing materials including web sites, newsletter, flyers, publications and media/TV opportunities.

13 **ANTICIPATED OUTPUTS TO BE ACHIEVED FOR 2015**

The main outputs expected for 2015 include the following:

• Completion of the first draft of, ‘A Guide to Forensic Geology’;
• Plan the Forensic Geology session at the 35th International Geological Congress, in Cape Town, South Africa, in 2016;
• Initiation of the first MSc in Forensic Geology, in Messina, Italy;
• Deliver of training, knowledge transfer and outreach events in; Japan, USA, UAE, UK and possible Latvia and Belarus; and,
• Publications and marketing of IUGS-IFG.

14 **BUDGET FOR 2015**

14.1 **Overview**

Throughout 2015, IUGS-IFG expects to continue a programme of promoting and developing forensic geology around the world. This is anticipated that this programme will include a series of events that will require funding assistance. IUGS-IFG also proposes to continue to develop the first draft of ‘A Guide to Forensic Geology’ and a steering group committee meeting will be required in 2015 to discuss this ‘Guide’. Consistent with the period 2011 to 2013, IUGS-IFG plans to break even or generate a small surplus funding, which can be carried forward to be reinvested in the development of forensic geology. IUGS-IFG will also continue to request and obtain contributory funding and funding services in-kind in addition to the core funding that is provided by IUGS.

In 2011-2014 IUGS-IFG has been successful in attracting additional financial support to assist with international events. IUGS-IFG would request that we can ‘roll forward’ the current balance of USD$5,624 to assist with the proposed meetings and events in 2014.

IUGS-IFG kindly requests the maximum available budget of $USD 15,000 funding from the IUGS Executive Committee for 2015 to help the group continue to pursue the global development of forensic geology throughout 2015 and beyond.
APPENDIX I: SELECTED PUBLICATIONS
Books, Book Chapters and Monographs


Refereed Journal Articles


Conference Proceedings and Papers


   http://www.aomevents.com/ANZFSS2014/Speakers/Call_for_Abstracts


   http://www.aomevents.com/ANZFSS2014/Speakers/Call_for_Abstracts

Conference Posters


Popular Press & Media Articles


Presentations


63. Donnelly, L. J. (2014). International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG).Overview of Potential Geochemical Soil Sampling. Presentation to a UK Police Force Friday 14 February, 10:00-12:00 ([Confidential].


APPENDIX II: SELECTED IMAGES
Copy of the IUGS-IFG Poster Displayed at The International Association of Forensic Science (IAFS), Korea, October 2014
Ekaterina Nesterina (left) Lorna Dawson (middle) and Olga Gradusva (right) at the ENFSI trace evidence meeting, Carabinieri Headquarters, Rome (Photo: Lorna Dawson)

Rob Fitzpatrick, featured in The Adelaidean 2014 (Photo: Paul Shand, CSIRO Land and Water)

(Upper and Lower) Collection of soil samples in glass vial for VOC analysis and leachate detection from a shallow, unmarked, homicide grave in Europe (photo: Laurance Donnelly)

Training in search to locate drugs (photo: Lorna Dawson)

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

Training in trace evidence sample collection (photo: Lorna Dawson)
(Left) Forensic Geology, at the Geologists Association Festival of Geology, London, UK, November 2014 (Source: Geologists Association). (Right) Ritsuko Sugita and the IAFS, Korea (Photo Christopher Palenik)

Welcome From the Chair

The International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG) was officially launched during the 32nd Executive Committee Meeting of the IUGS, which was held at UNESCO headquarters, in Paris, France on 22nd February 2011. On 16th September 2011, the IUGS-IFG and its newly formed committee members became formally established and launched at an inaugural meeting in Rome, Italy.

IFG Committee Inaugural meeting in Rome

IUGS-IFG’s mission is; ‘to develop forensic geology internationally and promote its applications’. This will be achieved by capacity building (raising levels of awareness, knowledge and providing information about forensic geology), technology transfer and training (improvement of skill sets) and outreach (educating and informing the police and law enforcement organisations and the ‘general public’ about forensic geology).

IUGS-IFG has established a Committee to manage and develop the working group. This comprises representatives from major geographical regions of the world to give global coverage. It includes specialists
Announcement of the First MSC master Course in Forensic Geology, Messina, Sicily, August 2014

University of Messina
Department of Environment, Security, Territory, Food and Health Sciences (S.A.S.T.A.S.) "Carmelo Abbate"

First Level Postgraduate Master Class in Forensic Geology.
Academic Year 2014/2015 Competition Announcement.

The University of Messina has established a Masters Degree (Rectoral Decree) program starting in the 2014-2015 school year. The course is being sponsored by the Italian National Council of Geologists (CNG), The International Union of Geological Sciences (IUGS) Initiative on Forensic Geology (IFG), and the Municipality of Ali Superiore (Messina) and the program is sponsored by Ambrogeo, Alfatest, and Malvern. Based on above-mentioned (and possible further) sponsors, some scholarships will be provided. The scholarships will be based both on financial incomes (ISEE) and merits.

The Master is a specialization, higher educational, cyclical, and long-term course with a final First Level Postgraduate Master degree, after a final exam (Ministry Decree 22/10/2004 n° 270 "Modifiche al regolamento recante norme concernenti l’autonomia didattica degli Atenei” approved by the Decree of the Ministry of University and Scientific and Technological Research 3/11/1999 n° 509). The Master is realized due to the art. 20 of the University Didactic Rules.

More information along with the application forms - both in Italian and English - can be found at http://www.unime.it/dipartimenti/sastas/_bandi_e_concorsi_studenti/master_di_i_livello_in_geologia_forense_i_edizione_a_a_2014_2015-16378.html

The deadline is 6th October 2014 by 12pm
Search for Missing Service Men, Belarus, October 2014

Search for service men ‘missing in action’ in Belarus (source: Dmitry Brishten)
Selected Presentations to IUGS Executive Committee (India, February 2014) and The Geologists’ Association (London, November 2014)
For further information
http://www.forensicgeologyinternational.org or http://www.forensicgeologyinternational.org

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