



IAEG 50

IRISH ASSOCIATION FOR ECONOMIC GEOLOGY

Irish-type Zn-Pb deposits around the World

IAEG 50th Anniversary Conference

Galway Bay Hotel, Salthill.

7th to 10th September 2023

Programme



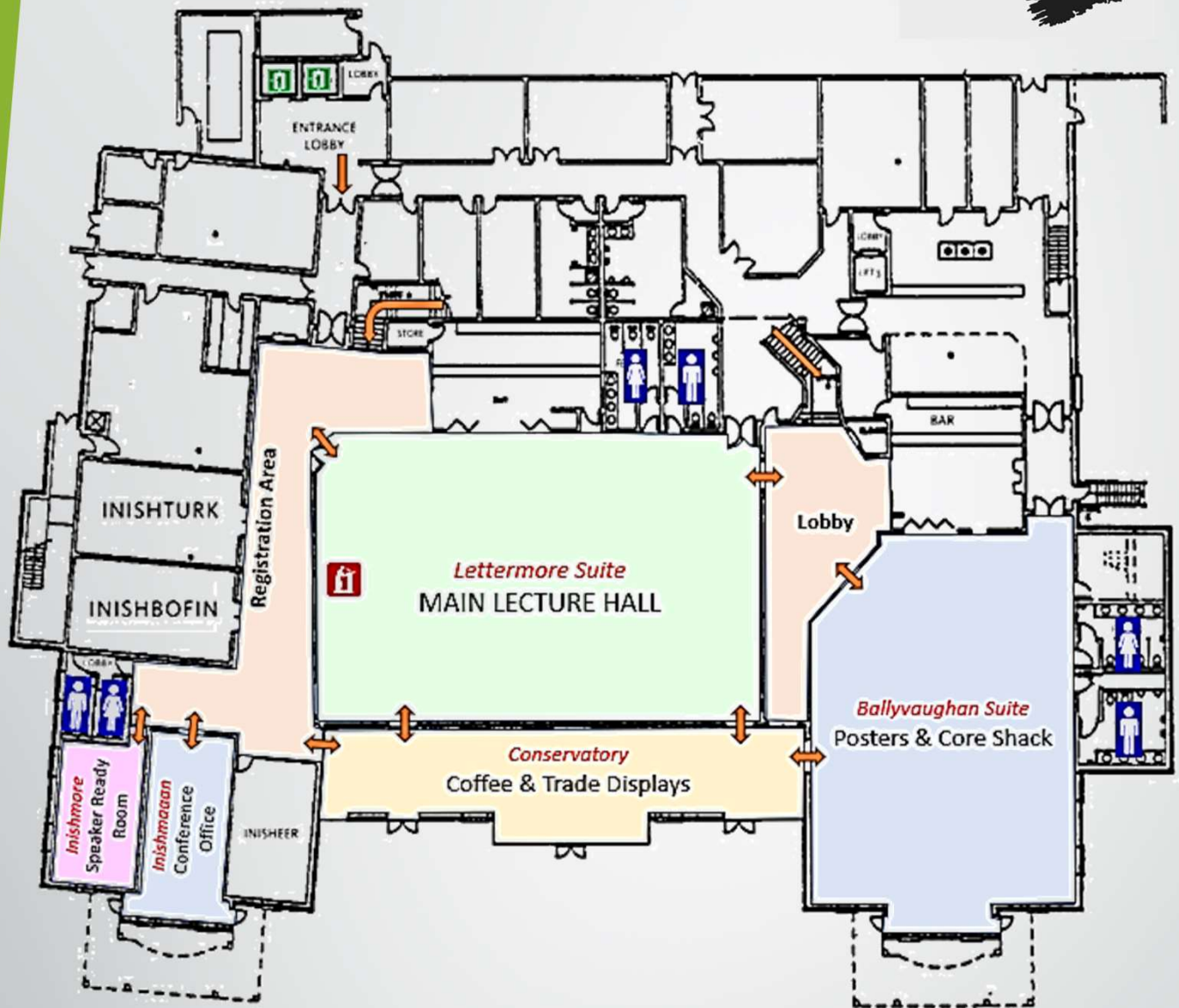


1973 to 2023

Welcome to the celebration of 50 years of the Irish Association for Economic Geology

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Plan of Conference Floor



The planning and organizing of a conference such as this is no small undertaking and many people from the IAEG Conference Committee, the IAEG Councils over the past two years and those willingly and even unwillingly cajoled to assist are thanked most sincerely for all their efforts. These thanks are also due to you the attendees as the conference would not have any merit without you.

Colin Andrew
Ally Barrow
Lynne Doyle
Gerry Stanley
Murray Hitzman
Noelene Fox
Graham Reid
John Clifford
Shane Lavery
Elena Geiger

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Message of Welcome



On behalf of the Organising Committee for the 50th Anniversary Conference of the IAEG it gives me great pleasure to welcome you to Galway. The location is significant in that 62 years ago the discovery of the Tynagh deposit some 40km east of here marked not only the birth of the modern Irish mining industry but also the first sight of a truly Irish-type Zn-Pb deposit. Rapidly accelerating exploration during the 1960s led to the discoveries at Silvermines, Gortdrum, Keel, Ballinalack, Aherlow, Tullacondra, and, in 1970, the giant Navan deposit.

It was during this period that the Irish Association for Economic Geology was conceived and formed as an organization run by its members for its members. Now, 50 years later we are proud to welcome you to this conference which celebrates the 50th anniversary of the IAEG and notes the remarkable efforts by past Presidents and Councils in supporting research and the diffusion of knowledge on the Irish deposits.

It was at an IAEG meeting held at the Prince of Wales Hotel in Athlone in September 1976 that the term “Irish-type Zn-Pb deposit” came into being during a presentation by Stuart Taylor and Colin Andrew on the Mogul of Ireland Mine at Silvermines. The resultant paper published in the Transactions of the IMM and presented at the Geological Society in London in 1978 exposed the term to a wider audience. Since then, the term has been applied to Zn-Pb-(Ba) deposits far away from Ireland and globally a number of other deposits have been classified as being “Irish-type” based on a range of similarities with the typomorph at Silvermines. Many of these will be described at this conference including Mediabad and Irankuh (Iran), Zavar (India), Gays River (Nova Scotia, Canada), deposits in China, Tunisia, Sardinia, Croatia and in the Kootenay Arc of British Columbia, and the “Alpine-type” deposits hosted in the Triassic carbonates of Slovenia, Austria and Bulgaria. The impact of Irish-type Zn-Pb deposits has even stretched as far as NASA’s *Alkaline Vent Theory for Life’s Emergence* – a theory inspired by field work and exploration at various base-metal mines in Ireland.

I would like to take this opportunity to thank two groups of people without whose efforts this conference would not have taken place. First to our meeting sponsors who have generously supported and subsidised the meeting as without their generosity the Conference would undoubtedly be a shadow of what we now have in front of us. Secondly, following a very special effort by John Clifford and his sub-committee, the SEG and IAEG has enabled two student economic geologists to attend the conference at little cost. At this time of shortages of vital skills in our industry it is heartening to see these organizations putting hands into its pockets to support the education of what is the lifeblood of our industry.

I urge you to participate in all the elements of the conference both technical and social. Amongst attendees we have many eminent academics and scions of industry who will, I am certain, be more than delighted to share their experiences and knowledge. We hope you enjoy the hospitality that will be on offer and wish you a very successful meeting.

Colin J. Andrew

Chairman – Organizing Committee

Welcome by the President of the IAEG



On behalf of the Irish Association for Economic Geology I am delighted to welcome our delegates for 'IAEG 50: Irish Type Zn-Pb Deposits around the World', celebrating 50 years of this esteemed Association. This conference has drawn speakers and delegates from over 25 countries, truly a testament to the far-reaching impact and influence of Irish-Type deposits. It has been 13 years since our last landmark conference 'Zinc 2010' and subsequent 2015 publication 'Current Perspectives on Zinc Deposits'. Since the first publication in 1986, the IAEG decennial meetings have become a well-established forum for generating discussion surrounding new concepts and techniques and providing the arena for geologists to collaborate and share ideas, often with far-reaching consequences. I am confident that IAEG 50 will be no different. It is remarkable to me that the term 'Irish-Type deposits' taught in education institutions globally, originated at an IAEG meeting in 1976. It is inspiring to me that a concept that is now so prevalent, can be attributed to our Association and so I can think of no better topic than this to celebrate 50 years of the IAEG itself.

I am incredibly proud to be the President of this Association during its 50th year, following a long list of accomplished geologists that have contributed to making the Irish economic geology sector what it is today. I find it humbling, being still relatively early in my career, to now be included amongst these names, many of whom have authored the very papers that I learned about Irish ore deposit geology myself or have mentored and given guidance throughout my career so far. Many past presidents of the IAEG have gone on to be leaders in their field or started their own companies which is further testament to the influence and quality of the IAEG committees throughout the years.

It is my hope that this conference can stimulate interest and lead to further discoveries much like Geology and Genesis of Mineral Deposits in Ireland in 1986 helped to ultimately bring Galmoy and Lisheen to fruition. This conference is not only a celebration of our Association but for what it stands for – the advancement and support of the Irish economic geology industry. The global landscape of mineral exploration and mining is changing but one thing that has not and will not change is the world's need for metals, which Ireland can and will continue to provide. The IAEG I joined 8 years ago is not the IAEG of 50 or even 15 years ago. The minerals sector is having to adapt rapidly, and it is my hope that the Association continues to evolve, stay relevant and most importantly, appeal to the next generation of Irish geologists. I am proud of our traditions, but we must also review our activities and what we offer going forward as an Association. This school of thought in part is what inspired our rebrand in 2022 and the launch of our website in 2018, but these steps are merely the preface to the actions we need to take. In a world that increasingly steers new graduates away from an economic geology career-path, I hope to see more outreach and show that it is still very much a viable, important and fulfilling option.

The IAEG has dedication and a passion for geology at its very core, which as an entirely voluntary organisation, has managed to sustain a 10-person council every year for 50 years. It is the product of half a century of collaboration, tireless efforts and freely given time from countless members. I wish to thank all past IAEG council members for their dedication and time invested in making this what it is today. Anybody who has been on the council appreciates just how much work goes on behind the scenes. Given our long-standing traditions, the activities of the IAEG can seem as though they just come into being, but I can attest to the amount of work behind every talk, annual conference and annual review, much less a conference on this scale and accompanying publication, of which this is the fifth such event. To that end I also wish to sincerely thank the IAEG 50 Conference Organising Committee: Colin Andrew, John Clifford, Gerry Stanley, Lynne Doyle, Murray Hitzman, Noeleen Fox, Shane Lavery and Graham Reid for their immense contributions to making this happen. Colin (who with Stuart Taylor) was the progenitor of the term, and John and Gerry were at the very meeting which spawned the neologism 'Irish-Type deposit' back in 1976. Their expertise, experience and knowledge of the Irish geology industry has been utterly invaluable.

I am confident that this volume aptly pays homage to the efforts of the authors, editors, referees, conference organisers and our sponsors. It is my hope that it will become another landmark publication and staple reference present on the bookshelf of any economic geologist globally, like the 'Green Book' before it, and that it amplifies understanding and recognition of Irish-Type deposits globally.

Ally Barrow

President, 2023.

Sponsors



Considerable financial sponsorship was received which ensured the 50th Anniversary conference could take place, and a special mention of gratitude must be given to all our corporate Sponsors as without their staunch support this conference and the volume would have been impossible.

The IAEG is also honoured and grateful that both the Society of Economic Geologists (SEG) and Society for Geology Applied to Mineral Deposits (SGA) actively supported and sponsored the conference and, as Platinum Sponsors, have their logos on the cover of the volume.

Quarry & Mining Equipment Ltd (QME) and ALS Laboratories Ltd. (ALS) are also Platinum Sponsors, and we offer our sincere thanks for their support.

We also thank our Gold and Bronze Sponsors for their generous support, it is really very much appreciated.

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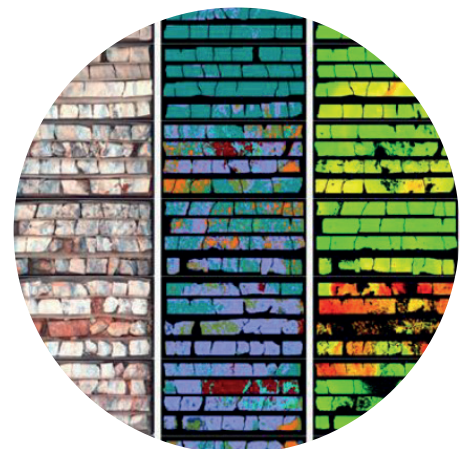
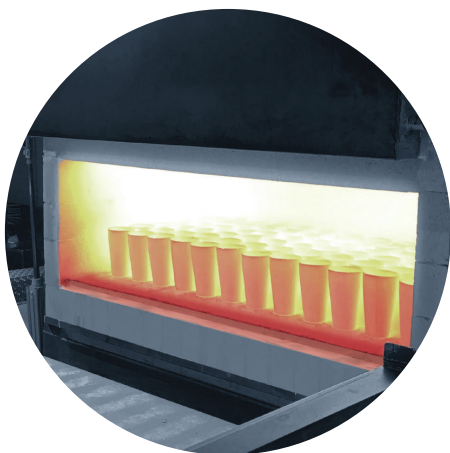
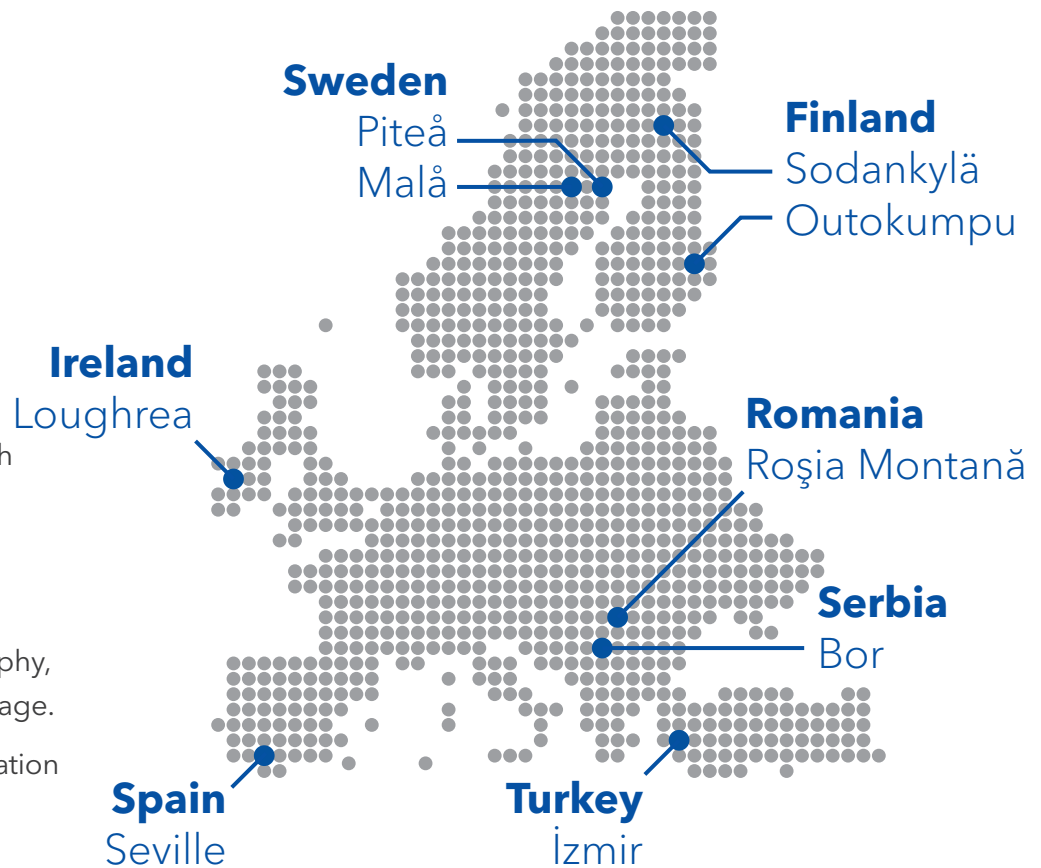


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Society of Economic Geologists

The Society of Economic Geologists (SEG) was founded in 1920. SEG has more than 4,000 members in 84 countries committed to excellence in the science, discovery, documentation, interpretation, evaluation, and responsible development of mineral resources. SEG is renowned for publications, including the journal *"Economic Geology"*, and activities that meet the essential professional and scientific needs of its diverse membership.



Society for Geology Applied to Mineral Deposits

The Society for Geology Applied to Mineral Deposits (SGA) is an international scientific society that promotes the science of mineral deposit geology. Its worldwide membership of approximately 700 is composed of researchers, professionals and students from university, industry and government interested in economic geology, mineral resources, industrial minerals and environmental aspects related to mineral deposits. The objectives of the SGA are:

- To advance the application of scientific knowledge in the study and the development of mineral resources and their environment,
- To promote the profession of geology in science and industry,
- To cultivate personal contacts for mutually beneficial relationships,
- To protect and improve professional and ethical standards among its members.

The SGA was founded in 1965 in Heidelberg and incorporated in Switzerland in 1971.



Irish Association for Economic Geology

The Irish Association for Economic Geology (IAEG) was founded in 1973 as a body with the goal of providing a professional association for geoscientists in Ireland. The objectives of the association are: 1) To provide an association for geoscientists working in the field of Economic Geology and to advance the science and practice of Mineral Exploration, Mining Geology and Petroleum Geology in Ireland. 2) To provide information regarding mineral exploration and mineral production, and to act on behalf of its members in all matters of general concern to the industry. 3) To provide information regarding oil/gas exploration and production and to act on behalf of its members in all matters of general concern to the hydrocarbons industry. 4) To encourage and assist in the education and employment of geologists and geo-technicians in Ireland. 5) To promote an interchange of ideas and information relevant to economic geology, to organize field excursions and regular meetings for the presentation and discussion of papers, and related matters. Currently the Association has over 200 Members.



ALS Laboratories

ALS Loughrea (formerly OMAC) is a major employer in Loughrea with about 200 employees and also has life sciences laboratories in Ireland including Portadown, Co Armagh; Little Island, Co Cork; Portlaoise, Co Laois; and Clonmel, Co Tipperary. OMAC joined Australian listed ALS in 2011 as its principal geochemical laboratory (Hub Lab) in Europe which serves Europe, North Africa and central Asia. ALS Loughrea now operates a state-of-the-art laboratory from a 3,000 sq metre premises on Dublin Road. It's the largest and best equipped such laboratory outside of the Americas and Australia and is well known for its very high quality.

The lab is fully equipped with the latest technologies available in the market to provide our valued customers with a wide range of analytical services.



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QME undertakes contract mining projects in Ireland and abroad. The mining division employs a team of highly experienced operations Managers, underground supervisors, miners, fitters and electricians. QME has carried out large- and small-scale underground development contracts since 2009. QME offer rental and ownership opportunities for new and used mining and tunnelling equipment. QME has over 35 years experience in the Mining and Tunnelling Industries. As a result of industry involvement QME has established close associations with globally recognised OEMs, allowing us to offer the end user the equipment of choice with lowest possible total cost of ownership. Our full range of new mining & tunneling equipment are backed with full factory warranty, technical support, OEM parts and a network of local and regional service centres.

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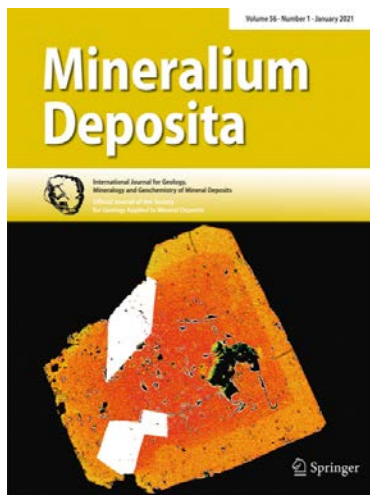
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Applied to Mineral
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See www.e-sga.org

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>50 countries represented

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Mineral Resources in a Changing World

General Information

Galway

Galway's a small city in the west of Ireland, but it's packed to the rafters with some of the liveliest pubs in Ireland. Yes, the city does attract plenty of tourists, but Galway's pubs are home to some mighty craic! From great trad music at *An Púcán* to the ample whiskey selection at *The Front Door*.

Salthill

Salthill is a seaside area in the City of Galway. Lying within the townland of Lenaboy, it attracts many tourists all year round. There is a 2km long promenade, locally known as the Prom, overlooking Galway Bay with bars, restaurants and hotels.

Salthill Beach is located on Galway Bay and is within a Special Area of Conservation (SAC), meaning there's plenty of wildlife so expect to see birds like Terns, Cormorants, Red-breasted Merganser and Black-throated Divers

Registration Desk

Opening times:

Thursday 7th September 16.00 – 19.30

Friday 8th September 07.30 – 09.00

Saturday 9th September 08.00 – 09.00

Contact Number : **087 777 3865**

Enquiries for the following should be made at the registration desk:

- General information regarding the conference
- Social events
- Daily excursions
- Accompanying persons' programme.

What is included in your Registration:

- Admission to all conference sessions,
- Admission to Core Shack,
- Admission to Trade Displays,
- Copy of ~750page hard case Conference Volume,
- Admission to all Tea & Coffee Breaks,
- Admission to Ice Breaker Reception on Thursday 7th September,
- Buffet lunches on 8th, 9th and 10th September.

Internet (wi-fi)

Open access on "[Free wifi Galway Bay Hotel](#)"

Speaker Preview Room

The speaker preview room is located on the Conference Level in the Inishmore Suite. All presentations must be handed in as early as possible to the registration desk preferably on a USB thumb drive.

Speakers should meet the Chair of their session at the end of the previous session.

Poster Programme

Poster boards are located in the Ballyvaughan Suite on the Conference Level. Contact the Conference Registration Desk for assistance.

Trade Exhibitions

Poster boards are located in the Lettermore Conservatory on the Conference Level. Contact the Conference Registration Desk for assistance.

Core Shack

The core shack displays are located in the Ballyvaughan Suite on the Conference Level.

Badges

Your badge must be worn at all time as it is your ticket to all sessions, tea/coffee, lunches, and the Ice Breaker Reception.

Green Badge - Full Delegate

Blue Badge – Organizing Committee Member

Purple Badge - Speaker

Lunches

Lunch is included in the Conference Registration fee and will be served in the Restaurant of the conference hotel between 1.00pm and 2.00pm on Friday 8th, Saturday 9th and Sunday 10th September.

Any specific dietary requirements should be advised when registering.

Lost and Found

Articles found should be taken to the Registration Desk

General Information



Insurance

The Conference Organising Committee or its agents, will not be responsible for any medical expenses, loss or accidents incurred during the conference. Delegates are strongly advised to arrange their own personal insurance to cover medical and other expenses, including accident or loss. Where a delegate has to cancel for medical reasons, the normal cancellation fee will apply. It is recommended that citizens from EU countries bring with them a current EHIC card.

Smoking Policy

Smoking and the use of e-cigarettes is not permitted indoors in any building in Ireland by Law since 29th March 2004. This means smoking is forbidden in all enclosed places including office blocks, various buildings, public houses/bars, restaurants, theatres and cinemas, on public transport and in all company vehicles (cars and vans).

Messages

Urgent messages may be left on the message board at the Registration Desk.

Bank

There is an AIB Bank on Upper Salthill Street around 1km from the Conference Hotel open Monday to Friday. There are automatic teller machines in many shops and hotel lobbies taking most international bank and credit cards.

Shopping

Galway has a busy city centre shopping area around Eyre Square and Shop Street. There is a huge range of products to bring home, from traditional Irish handmade crafts to international designer labels.

Things to buy: woollen knits, tweeds, crystal, Claddagh rings, pottery, silver and music. Shopping hours are from 9.00am to 6.00pm, Monday to Saturday, with shops open until 8.00pm on Thursdays, and most shops open from 12.00 noon to 6.00pm on Sundays.

Eating Out

Galway and Salthill has several wonderful restaurants ranging from Michelin starred establishments to simple good pub food. A list of restaurants will be available in the delegate packs.

Tipping

Tipping is at your discretion. In some hotels and restaurants, a service charge of 10-15% is added to your bill. A small tip is appreciated for good service. Tipping is unusual in pubs and bars and not expected. Tip taxi drivers 10% and porters €1 per bag.

Taxis

In Galway taxis are available at designated taxi ranks and can also be hailed down. Alternatively, you can book a taxi with the recommended taxi companies.

- United Taxis Salthill 091 529900
- Galway Taxis 091 561111
- Big O Taxis 091 585858

Medical Emergency Contact Number

University Hospital Galway 091 544544
Newcastle Road H91 YR71
www.saolta.ie/hospital/university-hospital-galway

Salthill Medical Centre 091 522139
216 Upper Salthill Road
www.salthillmedicalcentre.com

Lower Salthill Medical Practice 091 522507
61 Lower Salthill Road.
www.galwaydoctor.com

Police

Salthill Gardai, 091 514720
Dalysfort Road, Salthill

Social Programme



Welcome Reception

Date: Thursday 7th September

Venue: Seascope Lounge, Ground Floor Galway Bay Hotel

Time: 19:30-21:00

Dress: Casual

The welcome ice breaker reception will take place in the Seascope Lounge of the Galway Bay Hotel (the Conference venue). This evening will provide an opportunity for delegates to meet in a relaxed environment and catch up with old friends.

Drinks and finger food included.

Cost included in Registration Fee

Conference Gala Banquet

Date: Saturday 9th September

Venue: Lettermore Suite, Lower Ground Floor (Conference Level), Galway Bay Hotel

Time: 19:00-02:00

Dress: Smart Casual

The social highlight of the Conference with invited guests from Government, the Main Sponsors and IAEG Presidents from the previous 50 years.

Gourmet food and wines and speeches from invited speakers recounting yarns of the past half century of economic geology in Ireland (and overseas).

Cost €60 per person, tickets available (subject to availability) in advance and from Conference Registration Desk

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Technical Programme

Friday 8th September



Session 1		Opening, Keynote and backgrounds.	09.00 – 11.00
		<i>Chair: Colin Andrew</i>	
9.00	9.05	Official Conference Opening by IAEG President	Ally Barrow
9.05	9.15	Welcome & Introductory Remarks	John Clifford
9.15	10.00	On Irish bacteriometallogenesis and its wider connotations	Mike Russell
10.00	10.15	Zinc: its importance, the market and its future	Peter Wojcik
10.15	10.30	“What has Zinc ever done for us?” A geologist’s assessment of zinc’s contribution to the Irish economy.	Paul MacDermott
10.30	11.00	Irish-type deposits in the context of global zinc supply	Pat Redmond

Coffee Break

Session 2		Introductions to Irish-type deposits	11.30 – 13.00
		<i>Chair: Murray Hitzman</i>	
11.30	12.15	Global Irish – Diversity of the diaspora.	Neal A. Reynolds , R. Mark Allen , Peter Muhling & Charlie Gianfriddo
12.15	13.00	Irish Zn-Pb deposits - What are they and can we find more?	John H. Ashton , Colin J. Andrew & Murray W. Hitzman

Lunch

Session 3		Ireland - Principal Characteristics	14.00 – 16.00
		<i>Chair: Mike Russell</i>	
14.00	14.45	Irish Zn-Pb deposits – a review of the evidence for the timing of mineralization	Colin Andrew
14.45	15.15	Tracing metals from source to sink in Irish-type Zn-Pb(-Ag-Ba) deposits	Jamie Wilkinson
15.15	15.45	Taking account of S isotope geochemistry in the genesis of Irish-type base metal deposits	Adrian Boyce , Tony Fallick & Gary Mullen
15.45	16.00	Geological Survey Ireland and Irish-type deposits	Eoin McGrath

Tea Break

Session 4		Limerick Basin	16.30 – 18.00
		<i>Chair: Gerry Stanley</i>	
16.30	17.00	A review of the Limerick Igneous Suite: Links to base-metal mineralization in the SW Irish Orefield.	Paul Slezak , Danny Hnatyshin , Alejandro Andrés , Eoin Dunlevy , Hilde Koch , Mark Holdstock , & Murray W. Hitzman
17.00	17.30	The volcano-stratigraphic setting of the Pallas Green zinc / lead deposit, Co. Limerick	Dave Blaney & Edmond Coffey
17.30	18.00	A new look at the Gortdrum copper deposit, Co. Tipperary, Ireland.	Eoin Dunlevy , Koen Torremans , Mark Holdstock & Murray Hitzman

Whilst we sincerely hope that all our speakers arrive as planned, in the event of any problems any changes to the programme will be displayed on the Session Boards at the entrance to the Lecture Theatre.

Poster Session		18.00 – 19.30
	<i>In Ballyvaughan Suite</i>	

Technical Programme

Saturday 9th September



Session 5		Iran & Alaska	09.00 – 11.00
		<i>Chair: John Clifford</i>	
09.00	09.45	An introduction to Irish-type Zn-Pb deposits in early Cretaceous carbonate rocks of Iran	Abdorrahan Rajabi, Pouria Mahmoodi, Ebrahim Rastad, Carles Canet, Pura Alfonso, Shojaedin Niroomand, Ali Yarmohammadi, Hamid Peernajmodin, & Zahra Akbari
09.45	10.15	Geological and textural characteristics as evidence for Irish-type mineralization in the Eastern Haft-Savaran deposit, Iran	Pouria Mahmoodi, Jan M. Peter, Abdorrahan Rajabi & Ebrahim Rastad
10.15	10.30	Carbonate hosted Zn-Pb-Cu-Ba mineralization in the Mehdiabad deposit, Iran: New insights, new discoveries	Ghazaleh Khan Mohammadi, Abdorrahan Rajabi, Shojaedin Niroomand, Pouria Mahmoodi, Carles Canet & Pura Alfonso
10.30	11.00	Fraternal twins or distant cousins: comparing and contrasting the Red Dog and Irish Midlands orefields	Sarah Gleeson & Joe Magnall,

Coffee Break

Session 6		Europe & North Africa	11.30 – 13.00
		<i>Chair: Lynne Doyle</i>	
11.30	12.00	Genesis of the St Jacob Pb-Zn deposit in the Upper Triassic Lofers facies in the Dinaric carbonate platform	Ladislav Palinkas
12.00	12.30	The Sedmochislenitsi Z-Pb-Cu-Ag deposit, NW Bulgaria: Could it be Irish-type? A review of the evidence	Colin Andrew
12.30	13.00	Stratabound Zn-Pb deposits in NW Iberia: an unusual carbonate-hosted mineralization	Fernando Tornos, Lluís Boixet, Maria Zapparain, Luis Perez & Fidel Ribera

Lunch

Session 7		Europe	14.00 – 16.00
		<i>Chair: Graham Reid</i>	
14.00	14.45	Carbonate hosted "Alpine-type" lead-zinc deposits in the eastern and southern European Alps	Frank Melcher, Viktor Erlandsson, Veronika Gartner, Elisabeth Henjes-Kunst, Johann Raith, Gerd Rantitsch, Peter Onuk, Friedhelm Henjes-Kunst, Barbara Potočnik Krajnc & Aleš Šoster
12.30	13.00	Irish-type deposits in Tunisia: a new perspective to assign the Pb-Zn deposits of the Nefza District	Sophie Decrée, Alicia Van Ham-Meert, Jean-Marc Baele, Olivier Namur, Etienne Deloule & Christian Marignac
15.15	15.45	Base metals sulphides and barite in the Palaeozoic of SW Sardinia: from tectonically deformed SedEx and Irish-type deposits to post-Variscan hydrothermal karst and vein ores	Licia Santoro, Maria Boni, Francesco Putzolu & Nicola Mondillo.
15.45	16.00	A machine learning approach to geological modelling of an Irish-type Zn-Pb deposit	Gary Buchanan, Caroline Burden, Michael Absolom & Arpit Gole

Tea Break

Session 8		China & India	16.30 – 17.45
		<i>Chair: Sean Troy</i>	
16.30	17.15	Carbonate-hosted Pb-Zn deposits in China: a review of the geological characteristics and genesis	Lingli Zhou, Yi Zheng, Xiaoxia Duan, Yumiao Meng, Peng-peng Yu, Zhanke Li, Suofei Xiong, Fan Xiao, Yongbin Wang & Jiayi Zhou
17.15	17.45	Dolomite hosted Zn-Pb deposits of Zawar, Aravalli Supergroup, Udaipur district, Rajasthan, India	Shubhabrata Mukhopadhyay

Whilst we sincerely hope that all our speakers arrive as planned, in the event of any problems any changes to the programme will be displayed on the Session Boards at the entrance to the Lecture Theatre.

Technical Programme

Sunday 10th September



Session 9		Ireland Revisited	09.00 – 11.00
		<i>Chair: Kacie Wellington & Zoe Brown</i>	
09.00	09.30	A mineral system approach to the Clare Basin - integration of seismic and potential field processing with drilling data: Kilbricken and beyond	<u>Barry Murphy</u> , Lars Dahlenborg, Mike Hudson & Glenn Morgan.
09.30	10.00	The Rathdowney trend, Ireland: Geological evolution and controls on Zn-Pb mineralization	<u>John Guven</u> , Koen Torremans, Sean Johnson & Murray Hitzman.
10.00	10.30	Pyritic mineralization halo above the Tara Deep Zn-Pb deposit, Navan, Ireland: Evidence for sub-seafloor exhalative hydrothermal processes	<u>Lola Yesares</u> , Julian Menuge, Robert Blakeman, John Ashton, Adrian Boyce, David Coller, Drew Drummond & Ian Farrelly
10.30	11.00	The Kildare and Abbeytown Zn-Pb deposits - Irish but not Irish-type	<u>Gerry Stanley</u> & Colin Andrew.

Coffee Break

Session 10		North America	11.30 – 13.15
		<i>Chair: Ally Barrow</i>	
11.30	12.00	Sedimentary-hosted Zn-Pb deposits of the Maritimes Basin, Atlantic Canada: Comparison with Irish-type, MVT and SedEx deposit models	<u>James Conliffe</u> , Dan Kontak, Chaneil Wallace & Elizabeth Turner
12.00	12.30	Mineralogical and chemical characterization of Mississippi Valley-type mineralization in British Columbia and Alberta, Canada: Implications for ore-forming processes	<u>Dan Kontak</u> , Suzanne Paradis, Zach Waller & Mostafa Fayek
12.30	13.00	Summing Up & Conference Close	Murray Hitzman

Lunch

Whilst we sincerely hope that all our speakers arrive as planned, in the event of any problems any changes to the programme will be displayed on the Session Boards at the entrance to the Lecture Theatre.

Core Shack

Tara Deepes (Navan)	<i>New Boliden Tara</i>	Kilbricken	<i>Hannan Metals Ltd.</i>
Stonepark	<i>Group 11 Resources Corp</i>	Silvermines	<i>Colin Andrew</i>
Pallas Green	<i>Glencore</i>	Keel	<i>Diversified Asset Holdings Pty Ltd</i>
Tynagh	<i>Viridian Metals</i>	Abbeytown	<i>Erris Resources plc</i>
Lisheen	<i>iCRAG</i>	Ballinalack	<i>Group 11 Resources Corp</i>
Galmoy	<i>iCRAG</i>	Harberton Bridge	<i>Zinc of Ireland NL</i>

Representative drill core and samples from the above deposits will be on display in the Ballyvaughan Suite

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Piani Resinelli district: preliminary data on ore precipitation and multiphase diagenetic evolution

L. Summino¹, M. Giorno², L. Barale³, C. Bertok¹, M. Frenzel², M. Gasparrini⁴, L. Martire¹

¹ Department of Earth Sciences, University of Turin, 10125 Turin, Italy

² Helmholtz Institute Freiberg for Resource Technology, 09599 Freiberg, Germany

³ Institute of Geosciences and Earth Resources, CNR-Turin Unit, 10125 Turin, Italy

⁴ Department of Earth Sciences, University of Milan, 20133 Milan, Italy

Abstract: The strata-bound, carbonate-hosted Pb-Zn-Ag deposit of Piani Resinelli belongs to the Alpine metallogenic province. The mineralization is hosted in the lower Carnian stratigraphic succession of the Lombardian Basin (Southalpine Domain, North Italy). The origin of the deposit is still unknown as previous studies are largely outdated. This study aims to constrain the ore-forming conditions using petrographic, geochemical and fluid inclusion studies on both ore minerals and associated diagenetic cements. The mineralization was preceded by dolomitization, silicification, dissolution and brecciation events. Preliminary thermometric data on fluid inclusions indicate the involvement of moderately hot temperature (between 115 and 150 °C), high-salinity brines (up to ~20 wt eq% NaCl) in ore genesis. *In situ* analyses (EPMA, LA-ICP-MS) of trace elements in sphalerite are in progress and will be presented with their implications on ore-forming conditions. The origin of the Resinelli district was probably linked to an Upper Triassic hydrothermal system, in which metal-rich fluids flowed upward along faults and associated fractures. This circulation in the Upper Triassic succession caused major mineralogical and textural modifications in the host rocks and the precipitation of ore minerals in a shallow burial setting. The host rock diagenetic evolution and the types of hydrothermal fluids involved in ore precipitation share similarities with the nearby Gorno district, suggesting that the two deposits could have formed during the same regional mineralizing event.

Anomalous SedEx mineralization at the Walton Ag-Pb-Zn-Cu carbonate-hosted sulphide deposit (Nova Scotia, Canada): result of hydrocarbons?

Chaneil J. Wallace, Daniel J. Kontak, Elizabeth C. Turner

Harquail School of Earth Sciences, Sudbury, ON P3E 2C6, Canada

Abstract: Walton is a past-producing Ag-Pb-Zn-Cu sulphide carbonate-hosted deposit (head grade of 350 g/t Ag, 4.28% Pb, 1.29% Zn, and 0.52% Cu) hosted primarily by sideritized Viséan Macumber Formation limestone. Previous work demonstrated that mineralization occurred from heated (~300°C), saline (20-28 wt. % equiv. NaCl) fluids. The present study uses optical microscopy, SEM-EDS, and major- and *in situ* LA-ICP-MS trace-element signatures of the host, gangue, and ore phases to refine the understanding of the mineralizing fluid system. Sideritization of the Macumber Formation occurred after dolomitization. Dolomite and siderite are generally LREE-depleted, with mostly negative Ce anomalies and prominent negative Y anomalies. Arsenic in pyrite at Walton ranges from <1 ppm to 7.8 wt. % and correlates positively with Ag, which has values up to 1,700 ppm. The Ag in pyrite accounts for most of the Ag at Walton, although chalcopyrite is also enriched in As (to 4,200 ppm) and Ag (to 260 ppm). The LREE-depleted patterns indicate that the fluid did not equilibrate with a LREE-rich reservoir. The negative Ce anomalies suggest that the carbonates precipitated from an oxidised fluid. The positive correlation between Ag and As implies that they have a similar source and/or transport mechanism. The proposed source of metals is from hydrocarbons in the underlying Horton Group that may have been enriched in Ag, As, and Cu. The derivation of metals from hydrocarbons could explain differences between mineralization at Walton and other carbonate-hosted sulphide deposits in Nova Scotia that do not contain significant Ag, As, and Cu.

Subsurface geological characterization of the Limerick Syncline using seismic reflection and petrophysics

Victoria Susin^{1,2} & Aline Melo^{1,2}

¹ School of Earth Sciences, University College Dublin.

² SFI Research Centre in Applied Geosciences (iCRAG).

Abstract: The zinc-lead mineralization in the Limerick Syncline, southwest Ireland, is hosted in the Mississippian and Viséan carbonate rocks. Several Zn-Pb massive sulphide bodies have been discovered in the area, e.g., Pallas Green, Tobermalug and Carrickittle, making the Limerick Syncline emerge as an important sub-district of the Irish Zn-Pb Orefield. The sulphide mineralogy and stratigraphic setting are like other Irish-type deposits, the main difference is that the mineralization shows a close spatial and temporal association with the igneous rocks, the exact nature of which is poorly understood. Major gaps remain regarding the existence of deep faults, which appear to have some control on ore deposit location, and the relationship between base- metal mineralization and the Lower Carboniferous magmatism. To address these issues, we reprocessed vintage reflection seismic profiles to extract new information from the data and map major structures and intrusions. One of the key challenges for seismic imaging is the presence of thick volcanic sequences overlying the host rocks, causing strong signal absorption and transmission loss, and making it difficult to detect lithological boundaries. Recent downhole petrophysical data and laboratory petrophysical data acquired from multiple boreholes in the area give insights on sonic velocities over the Syncline and have enabled the reprocessing of the 2D seismic lines leveraging new petrophysics-guided velocity model building. The updated velocity model is used for depth migrations resulting in improved seismic profiles with better signal recovery below the volcanic sequences, displaying more interpretable reflectors and new insights on the structural setting of the Limerick Syncline.

Trace element geochemistry of pyrite and marcasite as a vector towards mineralization in Irish-type Zn-Pb deposits

Claire Geel, Aileen Doran, Maurice Brodbeck, Murray Hitzman

SFI Research Centre in Applied Geosciences (iCRAG).

Abstract: The Irish-type Zn-Pb deposits were formed when saline brines derived from Carboniferous seawater, containing bacteriogenically reduced sulphur, mixed with metal bearing hydrothermal fluids. In this process, iron sulphide minerals incorporated trace elements into their crystal lattice through solid solutions and nano-and/or micro-inclusions. As a result, the geochemistry of pyrite and marcasite may be able to provide valuable information about changes in the composition of mineralising fluids and the evolution of the hydrothermal system. This study examined the trace element and sulphur isotope geochemistry of pyrite and marcasite from the Rathdowney Trend and the Limerick Basin. Petrographic imaging was complemented with trace element (LA-ICP-MS) and Raman spectroscopic mapping to investigate morphological and textural variations in iron sulphides. Laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) was used to collect trace element data, while $\delta^{34}\text{S}$ isotopes were obtained in-situ via secondary ion mass spectrometry (SIMS). Trace element data reveal that early stage pyrite is enriched in Mn, Mo, and Cu while ore-stage pyrite and marcasite exhibit higher concentrations of As and Tl compared to early stage pyrite. On a regional scale, pyrite and marcasite located distal from the orebodies display greater enrichment in Mo, Cu, and Sb relative to iron sulphides proximal to orebodies. $\delta^{34}\text{S}$ isotopes values range between -50.4 and 10.5‰ with lighter values being prominent in the economic deposits, while heavier values occur in uneconomic deposits. This unexpected result suggests that the key feature to form orebodies is the availability of bacteriogenically reduced sulphide and that presumably deeper sourced fluids with heavier sulphur isotopic values can move significant distances from “feeder” structures but will not form ore unless they encountered significant biogenic sulphide. In conclusion, trace element and sulphur isotope signatures found in iron sulphides can serve as vectors, allowing us to identify zones with potentially significant concentrations of Zn and Pb in the Irish Midlands.

Deciphering hydrothermal clumped and strontium isotopes in the Irish Zn-Pb ore field: tracking fluid sources, mixing, and temperatures

Aileen Doran¹, Steven P. Hollis², Julian F. Menuge¹, Paul F. Dennis³, Alina Marca³, David van Acken¹

¹iCRAG and UCD School of Earth Sciences, University College Dublin, Belfield, Dublin D04 V1W8, Ireland.

²School of Geosciences, Grant Institute, The University of Edinburgh, Edinburgh, UK.

³Stable Isotope Laboratory, School of Environmental Sciences, University of East Anglia (UEA), Norwich, NR4 7TJ, UK.

Abstract: Irish-type deposits typically have carbonate minerals associated with all stages of ore formation, recording the evolution of the entire system. Fluid inclusion thermometry, carbon-oxygen (C-O) and ⁸⁷Sr/⁸⁶Sr ratios are traditionally used to study fluid temperature, sources and composition. However, fluid inclusions are often too small, ruptured, deformed or absent for adequate study and fluid $\delta^{18}\text{O}$ isotopic values have to be inferred using model temperatures, causing data uncertainties. In carbonate minerals, the rare, heavy isotopes ¹³C and ¹⁸O bond, or clump, more frequently at lower temperatures, with the magnitude of clumping inversely temperature-dependent. Measurement of clumped C-O isotope ratios, using gas source isotope spectrometry, simultaneously yields carbonate $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ values and generates mineral precipitation temperatures, allowing fluid $\delta^{18}\text{O}$ to be directly calculated rather than inferred. Recent applications include study of fluid temperature evolution and mixing in hydrothermal ore systems at up to ~ 250 °C. When combined with other techniques (e.g., ⁸⁷Sr/⁸⁶Sr ratios), new understanding can be gained of the sources, movement and compositional evolution of hydrothermal fluids. We present clumped C-O and ⁸⁷Sr/⁸⁶Sr ratios of carbonates from the Lisheen and Galmoy deposits, southern Irish Zn-Pb ore field, to constrain fluid sources, temperatures and mixing. Galmoy $\delta^{18}\text{O}_{\text{fluid}}$ values from undolomitized limestone range from 0.8 to 13.1 ‰, with clumped $T_{\Delta_{47}}$ temperatures up to 142 ± 9 °C recorded, overlapping those of later hydrothermal dolostones. Regionally dolomitised limestone display variable $\delta^{18}\text{O}_{\text{fluid}}$ values from both deposits (0.8 to 14.5 ‰), with differences noted between unbrecciated samples and clasts hosted in later hydrothermal breccias (matrix dolomite $\delta^{18}\text{O}_{\text{fluid}}$ range - 4 to 12.8 ‰). Matrix samples from these breccias also reveals clumped $T_{\Delta_{47}}$ temperatures of 64 ± 5 to 230 ± 16 °C, confirming a hydrothermal origin for these fluids. While all data plot on similar trends, samples from Lisheen and Galmoy may display discrete variations with Lisheen regional dolomite clasts commonly displaying lower $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values, but higher $T_{\Delta_{47}}$ and $\delta^{18}\text{O}_{\text{fluid}}$ values, than corresponding samples from Galmoy. While ⁸⁷Sr/⁸⁶Sr ratios become more radiogenic with time, with early limestone revealing the least radiogenic signatures (0.7079 to 0.7083) as expected. Overall, this research suggests that early dolomitizing and later hydrothermal fluids are part of a complex multistage continuum, with phases of fluid mixing, compositional buffering due to dissolution and isotope resetting.

Geometry and nature of inversion structures in the Irish Ore Field, their impact on mineral deposits and associated mineralization

La Donna Fredericks

iCRAG and School of Earth Sciences, University College Dublin, Belfield, Dublin 4, Ireland

Abstract: Inversion structures in Ireland were formed during the Variscan Orogeny (310 to >280 Ma) a regional mountain building event that resulted in folding, thrusting and reactivation of earlier extensional faults (~ 355 to 340 Ma). Specifically, understanding how these earlier faults were affected by inversion is a key step in better managing and exploring for our deep earth resources including geothermal energy and Zn-Pb-Ag mineralization in the Irish Orefield. Mineralization in the Orefield is both structurally and stratigraphically controlled, hosted along the contacts of Carboniferous rocks in the hanging wall of normal faults that may have been later inverted (Güven *et al* – this conference volume). This project will address fundamental and practical questions related to the structural evolution of inverted basins. The study area will be the Carboniferous basins in Ireland. The main research questions are: To investigate the geometry and nature of inversion-related deformation and to examine the main spatial, time, and rheological controls on the later inversion of Carboniferous basins, from regional down to mineral deposit and outcrop to borehole scale. The project will provide a quantitative framework for the heterogeneous nature of inversion-related deformation and strain. In particular, it will determine factors controlling structural inheritance and the longevity of structures through Irish geological history, such as the N-S decline in Variscan deformation and the localization of later Alpine deformation.

Lithofacies changes across faults in the Rathdowney Trend in relation to Zn-Pb mineralization and geothermal potential.

Hannah Othen, Rob Doyle, John Guv n, Aline Melo & Koen Torremans

SFI Research Centre in Applied Geosciences (iCRAG).

Abstract: The Irish Mississippian rocks host the world-class Irish carbonate-hosted Zn-Pb Orefield, as well as being an attractive target for geothermal energy within the fractured carbonate reservoirs which are both controlled by complex fault systems across the Irish Midlands. Here we focus in on one study area - the Rathdowney Trend in Southeast Ireland, to look at the lithofacies changes in borehole logs that have been collected from boreholes 3312-79, 3312-72 and DUR-2 which are in different locations relative to a fault. The Crosspatrick and Durrow Formations are similar across the logs, with Crosspatrick being a mix of wackestone and packstone with fossils present throughout, and the Durrow Formation being mainly grainstone with fossils and coquina beds throughout. The Aghmacart Formation shows clear changes across the fault, with 3312-72 in the hanging wall containing mainly mudstone with some wackestone and packstone intervals. The base is algal dominated with occasional coquina beds, while the top contains rootlet horizons and has a distinct lack of macrofossils. 3312-72 contains a large grainstone package towards the base called the Basal Grainstone Unit (BGU) and speckled bands of fossils at the boundary with Durrow Formation. Neither of which are seen in DUR-2 or 3312-79. DUR-2 is interpreted to be in the footwall of the fault and has much coarser, cleaner wackestone and packstone, with less common mudstone and grainstone bands. The top is algal dominated and has occasional argillaceous wisps and gastropods. While the base includes peloids and ooids with few fossils, the middle section has common coquina beds containing variable orientations of brachiopods, oolitic grainstones, peloids and solitary corals which diminish upwards. 3312-79 is located between 3312-72 and DUR-2 much closer to the fault and still in the footwall, shown by the large number of veins throughout as well as the absence of the BGU and the speckled bands. The logs show a distinct spatial lithofacies variation across the fault linked to footwall/hanging wall position and proximity to the fault, which includes the presence or absence of the speckled bands, chert, BGU and overall Dunham classification, which provide a preliminary analysis with distribution to the normal fault system in the Rapla area. Overall, the most noticeable change between the three logs is in the Aghmacart formation. This indicates that this formation was deposited during the fault movement. Changing the depositional environment of the same formation, with DUR-2 being deposited in a higher energy environment than the mudstone rich 3312-72 which is of a more protected lower energy depositional environment. These logs will be combined with seismic interpretations and petrophysical data to generate a 3D model of the area, to highlight Zn-Pb and geothermal prospects.

Geological and petrophysical characterization of the electromagnetic anomaly of the Lisheen Zn-Pb deposit in Ireland.

Nanyu Wei ^{1,2}, Aline Melo ^{1,2}, Koen Torremans ^{1,2}, John Guven ² & Murray Hitzman ^{1,2}

¹ – UCD School of Earth Sciences, Dublin.

² – Irish Centre for Research in Applied Geoscience (iCRAG)

Abstract: The project proposes to investigate the source of the electromagnetic (EM) response of the Lisheen deposit. While the distribution of minerals suggests that the feeder zones should be conductive because they have higher concentrations of Cu and Ni sulphides, the EM data from Lisheen deposit is used as a textbook example for a conductivity anomaly associated with the Zn-Pb mineralization. The inconsistency is that the Lisheen ore is not composed of high conductivity sulphides. One possibility is that the EM response is associated with the pyrite cap around the Zn-Pb ore. However, the pyrite in this cap is described as mainly disseminated and in veins, which contradicts the main premise of the application of EM data, the requirement for massive sulphide. Some parts of the pyrite cap is massive and one of the questions is whether their distribution and thickness are sufficient to cause the observed EM anomaly. Given this puzzle and lack of a clear understanding of the origin of the association between the mineralogy and the geophysical data, this project proposes to conduct a detailed petrophysical characterization of the different units in Lisheen. There is potential for developing exploration vectors to contribute to the challenge of supply of raw materials for the energy transition and make a difference in achieving sustainable development.

Ireland's fantastic critical raw materials - and where to find them at the micron scale

Maurice Brodbeck¹, Emma Tomlinson¹, Sean McClenaghan¹ & Claire Geel²

¹Trinity College Dublin, iCRAG, Department of Geology, Dublin, Ireland.

²University College Dublin, iCRAG, School of Earth Science, Dublin, Ireland.

Abstract: Ireland hosts a wealth of raw materials, some of which are critical for renewable energy generation, transmission and storage technologies. At the global scale, metals and metalloids are at risk of supply shortfalls, placing them in the critical field for raw materials. The European Union is strengthening its position by addressing its dependency on imported raw materials and increasing domestic production, recycling and manufacturing in the EU. In order to boost the EU domestic raw material supply, exploration for new deposits and improving extraction methods will be essential. Base-metal deposits, including Carboniferous Zn-Pb (Ge), Devonian granite hosted veins (Li-Ga-In) and Caledonian stratiform Cu (Co-In) are hosts for Critical Raw Materials (CRMs); to determine their CRM potential, the host mineralogy needs to be examined and CRM concentrations analysed, typically by laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). It is presented how metal(loid) department studies using LA-ICP-MS can effectively contribute to deciphering genetic processes of ore formation and to the identification of CRM host mineral phases; the latter being essential for tailoring geometallurgical extraction methods. Metal(loid) department studies can investigate whether CRMs are hosted in principal ore phases or within accessory mineral phases, which for example, has implications whether the target CRMs will be transferred to the concentrate or end up in the tailings after passing a flotation cell. Nevertheless, the quantification of CRMs in sulphide ores has its limitations due to the limited availability of suitable reference materials. Hence, new primary sulphide standards require development and natural sulphide samples need to be characterised for their use as natural quality control standards. The availability of new sulphide reference materials will lead to a refined quantification of potential critical elements in ore deposits, adding value to existing resources.

3D modelling of volcanic rocks in the Limerick Basin (Ireland) subsurface using integrated regional geophysical data analysis and inverse geophysical modelling

Prithwiji Chakraborti^{1,2}, Aline Melo^{1,2}, Tom Manzcchi^{1,2}

¹ Irish Centre for Research in Applied Geoscience (iCRAG)

² University College Dublin, School of Earth Sciences

Abstract: Zn-Pb mineralization in Limerick Basin has been found to exhibit close spatial association with volcanic rocks which is different from the rest of the Irish ore fields. Therefore, determination of the nature and distribution of volcanic rocks can largely facilitate the understanding of the underlying processes behind the formation of the mineral system and aid in discovering potential mineralized zones. This work focuses on 3D modelling of the volcanic units using newly acquired geophysical and petrophysical data. Due to the occurrence of glacial overburden over the entire study area, there lies a lot of uncertainty in the current geological map. To improve the understanding of the shallow subsurface geology under overburden, we integrate multiple geophysical data using innovative machine techniques supported by outcrop and drill hole data acting as ground truth points. The cluster map obtained using geophysical data integration acts as a proxy for the geological map which has been incorporated as prior information or constraints in our geologically constrained geophysical inversion framework. We have further devised new methods of incorporating drill hole data in the inversion framework which has been tested over synthetic data and is expected to improve the accuracy of our subsurface models when applied on the Geological Survey of Ireland's Tellus airborne magnetic data.

On the discovery of future Irish base-metal deposits

David Plunkett

Independent Consultant

Abstract: The need for mineral raw materials is well documented and in order to source such, mining is necessary; and this includes developed countries such as Ireland. Mineral deposits are not distributed uniformly around the world and different geological environments/histories yield different deposit types. Indeed, Ireland is the original setting for Irish-type base-metal deposits which are now recognized in other parts of the world. Exploration is, by definition, a journey into the unknown and successful mineral exploration has to be based on what is already known – historic work and research. As exploration is the act of exploring an unfamiliar area, when conducted correctly it will reveal new or unusual rock types or mineralization that require further investigation and discussion. Successful exploration requires strong, value-driven organisations or communities concerned with the discovery and mining of new deposits facilitated by the collaboration of membership. A classic Mineral System Approach ('MSA') is one that considers mineralization in the context of regional or even global geology. Hydrothermal fluids, ligands and metals sourced on the large scale, are driven through the crust from areas of high over-pressure to low and are trapped at a location where the fluid and chemical components become in disequilibrium, forming a mineral deposit. Complex System Science ('CSS') is a relatively new area of research that is concerned with the interdependent relationships between small-scale processes that may give rise to larger scale behaviours and patterns that themselves are self-organized. MSA may be used to both guide mineral exploration and to identify gaps in our understanding of components and interdependencies of the mineralizing system in order to guide potential learnings or research directions. In an Irish context, current research includes:

- Basement geology and deep crustal configuration to identify potential metal sources and deep fluid pathways.
- Occurrence and stratigraphic location of existing or previously existing evaporite minerals.
- Chemistry and halide systematics of fluid inclusions.
- The effects of syn-sedimentary faulting on carbonate and silicate sedimentary systems.
- Descriptions on the effects of dissolution, dolomitization, brine accumulation, clay accumulation, metal oxidation, sea-water sulphate reduction and replacement of carbonate and sulphide minerals at trap sites.

For this study, the analysis and interpretation of current research results is guided by both MSA and CSS. As a result, the components of the mineral system are not viewed in isolation but rather considered as inter-dependent entities, and deposit formation is considered as an emergent behaviour of the carbonate basin as a whole. The emphasis is on the large scale, as processes that occur on the smaller, more complex scale may not represent the larger scale behaviours. On the orogenic scale, deposits may relate to sudden changes in plate configurations effecting the carbonate basin, something that is theorised by the importance of a 'transient geodynamic trigger' in more recent research on MSA - an event that may be termed a 'singular event' in CSS. The definition of mineral exploration as a journey into the unknown, as well as the concepts from CSS and MSA have been used to discover new Irish prospects. Future research directions and new exploration rationales are discussed.

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Colin Andrew



Colin Andrew is a graduate of the Royal School of Mines and Imperial College, London and an economic geologist with over 40 years diverse mining industry experience at all levels from mine geologist to CEO and President of UK, Irish and Canadian listed entities. During his career he has been instrumental in the development to production status of five mines and the discovery of more than 13Mozs of gold and over 60Mt of base-metal ores in Bulgaria, Colombia, Peru and Spain. During this career he has worked on precious metals, base-metals and gemstones. Colin Andrew has published over forty-five technical papers in various academic journals and in several thematic conference volumes. He was the Editor of the SGA bi-annual conference volumes in 2007, and the IAEG's GGMDI volume in 1986. He has won both the 'Silver Medal and Premium, 1978' and the 'Gold Medal and Premium, 1985' from the Institution of Materials, Mining & Metallurgy. Colin was awarded Honorary Membership of the IAEG in 1986 and is a past President (2004). He was the instigator of the theme of this conference and Chair of the IAEG 50 Organizing Committee. In October 1976, with Stewart Taylor he gave a talk on Silvermines to the IAEG in the Prince of Wales Hotel, Athlone, and coined the term "Irish-type Zn-Pb" deposit.

e-mail: candrew@iol.ie

John Ashton



Originally from Aberystwyth in Mid Wales John's interest in economic geology was started at school during extensive underground exploration visits to the disused Pb-Zn-Ag mines of the Central Welsh Orefield. He graduated from the Royal School of Mines, London, in 1975 with a BSc in Mining Geology and then undertook PhD research at the University of Aberystwyth until 1978 into ore geology and wall rock geochemistry of Pb/Zn and Au veins in Wales. In 1978 he commenced his career at Mogul of Ireland Ltd, Silvermines, as mine and after a brief period, as senior mine geologist. He joined Tara Mines Ltd, Navan, in 1980. After working in several positions including Chief Mine Geologist, with involvement in computer systems, resource estimation, delineation and exploration drilling, he became Chief Exploration Geologist for Boliden Tara Mines in 2005. This included working with the exploration team that discovered the South West Extension in the mid-90s. Since then, he has been involved in extending the resources within and surrounding the Navan deposit and in exploration throughout the Irish Midlands carbonate-hosted Zn-Pb province. The major highlight was the management of the team that discovered the Tara Deep orebody extension in 2012 via seismic surveying and deep drilling. Experience and interests include 3D geological modelling, resource estimation, the genesis of carbonate-hosted Zn/Pb deposits and exploration for base metal deposits. Since March 2019 he has been providing consultancy services to Boliden Tara Mines.

e-mail: jhashton@hotmail.com

Dave Blaney



Dave graduated with a BSc in Geology from Queens University Belfast in 1987. He obtained professional accreditation from the Institute of Geologists of Ireland in 1999 and a MSc in Geotechnical Engineering, Design and Management from Nottingham Trent University in 2010. Dave joined Rio Tinto in 1987 as a junior exploration geologist working on gold exploration projects in Ireland and Portugal, before transferring to the Irish Midlands, carbonate hosted Zn / Pb project from 1990 to 1996, eventually assuming the role of Country Manager in 1995. He joined Noranda Exploration Ireland in 1996 as Senior Geologist, with responsibility for the implementation of their Irish carbonate hosted Zn / Pb programme, discovering the Pallas Green Deposit in 2002. In 2001 he was seconded to Noranda's Canadian High Arctic Programme, exploring for carbonate hosted Zn / Pb mineralization on Devon Island. In 2003, in partnership with Graham Reid, Dave founded BRG Ltd. and since then has worked on a wide range of projects including exploration and mining, quarrying, site investigation and environmental fields. He was intimately involved in developing Pallas Green from a minor exploration project to its current status as the second biggest Zn / Pb deposit in Ireland and he continues to be responsible for the management and implementation of the technical exploration programme at Pallas Green project on behalf of the current owner Glencore Zinc Ireland Ltd.

e-mail: blaneyd@brg.ie

Gary Buchanan



Since 2008 Gary Buchanan has worked with the team at Maptek's UK office based in Edinburgh, Scotland. The team works across Central Asia, Russia, Europe and North & West Africa. Gary's focus is Customer Development - helping to find technological solutions to challenging problems faced by Maptek's customers and future customers, as a part of the company's mission to help miners make better decisions. Gary studied Earth and Environmental Science at the University of Technology, Sydney and completed his Honours research project with the Australian Nuclear Science and Technology Organisation specialising in the human impacts on climate variability. Following a stint with Australia's largest construction materials company in several operational and technical roles, he moved to the United Kingdom to join Maptek. He is focused on understanding real-world applications for the technological solutions developed by Maptek, with a particular interest in improving orebody knowledge as relevant to mine planning. Recently, he has focussed on helping customers to understand and adopt algorithm-based orebody modelling solutions which exploit innovative machine learning software.

e-mail: gary.buchanan@maptek.co.uk

Maria Boni



Maria Boni joined the Geological Institute of the Napoli University in 1979, after her PhD in Heidelberg. After becoming Full Professor in Economic Geology, she retired in 2018, but is still working in research and collaborates with industry. Maria's research was dedicated to base metals ores in Europe (with the accent on Sardinia) and beyond (South America and Namibia). Her other interests included supergene non-sulphide deposits and bauxites. Since her research work in Namibia, Maria kept working on the geology and mineralogy of vanadium ores and developed a keen interest on V-deposits throughout the African continent.

e-mail: boni@unina.it

Speakers Biopics



Adrian Boyce



Adrian Boyce is Professor of Applied Geology at SUERC. He is a Fellow of the Society of Economic Geologists (SEG) and Geology Applied to Mineral Deposits (SGA) and a leader of applied stable isotope Geoscience research in the UK and beyond. Adrian has co-published over 285 peer-reviewed papers, many focused on the application of stable isotope geochemistry to hydrogeological processes. He has run the NERC Isotope Community Support Facility at SUERC for over 20 years, set in one of Europe's leading stable isotope laboratories, through which he has been responsible for the isotopic aspects of over 120 peer-reviewed NERC projects, including over 75 PhD students. He has demonstrated the utility of underpinning stable isotope techniques on research from km- to sub-millimetre scale fundamental hydrogeological processes from crustal fluid flow mechanisms to ocean vents to major ore deposits to geothermal energy.

e-mail: Adrian.Boyce@glasgow.ac.uk

James Conliffe



James Conliffe received his PhD from the National University of Ireland, Galway in 2008 and has worked for the Geological Survey of Newfoundland and Labrador since 2011. During this time he has been involved in research on enhancing our understanding the genesis of mineral deposits in Atlantic Canada, including sedimentary hosted base metal (Zn, Pb, Cu, Ag), iron-ore, VMS, orogenic gold and granite-related critical metal (Li, W, Mo, Sn, Cs, Ta) deposits. He has an extensive publication record and has published over 50 peer reviewed and government publications and almost 100 conference presentations.

e-mail: JamesConliffe@gov.nl.ca

Sophie Decree



Sophie Decree is senior geologist at the Geological Survey of Belgium. She started her career with the study of a mining district in Tunisia, which hosts a diversity of base metal deposits (Fe-Pb-Zn) related to Miocene magmatism. Working then as post-doc researcher at the Royal Museum for Central Africa, she had the opportunity to study the world-class supergene cobalt deposits and uranium deposits of the Copperbelt, bringing new insights into the formation and age of these ore deposits. Further investigations in Central Africa brought her to Burundi and the study of Neoproterozoic alkaline magmatic rocks and carbonatite, with a particular focus on the processes leading to the formation of related mineral occurrences/deposits (phosphates, REE, HFSE). Though being hired at the Geological Survey of Belgium since 2014, she carried on working on alkaline complexes in Africa (i.e. the Paleoproterozoic Phalaborwa complex and related world-class phosphate deposit, South Africa), focusing more and more her works on the speciation and distribution of phosphates and REE in such systems, applying a variety of methods to unravel the superimposed processes. Similar approach was applied to the Archean carbonatite complex of Siilinjärvi (Finland), and to various sedimentary phosphorites in Europe and worldwide. She was recipient of the Waldemar Lindgren Award (Society of Economic Geologists) in 2016. She is involved in professional societies/groups, as the Society for Geology Applied to Mineral deposits (member of the Executive Committee) and the Mineral Resources Expert Group of EuroGeoSurveys.

e-mail: sdecree@naturalsciences.be

Eoin Dunleavy



Eoin is a geologist specialised in linking basin evolution and ore forming processes. After an undergraduate degree in Geology at Trinity College, Dublin (2010) he worked for several years in industry, primarily on Irish base metal projects and Turkish porphyry & epithermal systems with Teck Resources. During this time, he became interested in the use of seismic data to unravel the evolution of sedimentary basins. In 2014, this led him to undertake a PhD at the University of Manchester using seismic and sequence stratigraphy to reconstruct New Zealand's continental margin. In 2019 he joined iCRAG / UCD to work with Prof. Murray Hitzman on the Irish Orefield. His research focused on unravelling the structural and stratigraphic context of ore deposits in the Limerick region (SW Ireland). In early 2023, Eoin joined Terranta GmbH as Senior Geologist, where he works toward developing tools that model basin scale fluid flow processes as a predictive tool for mineral exploration.

e-mail: e.dunleavy@terranta.de

Sarah Gleeson



Sarah A. Gleeson received a BA (mod.) in Geology from Trinity College Dublin and a PhD in geochemistry from the Royal School of Mines, Imperial College London. Subsequently, she held post-doctoral positions at the Natural History Museum, London and the University of Leeds before moving to the University of Alberta, Canada in 2001. Since 2016 she is the W3 Professor in Mineral Resources at the Freie Universität Berlin and leads the Inorganic and Isotope Geochemistry Section at the GFZ, Helmholtz Centre Potsdam. She is also the leads the Topic "Georesources for the Energy Transition and a High-Tech Society" in the Helmholtz Association's program "Changing Earth - Sustaining Our Future". She is an Associate Editor of the journal Economic Geology and on the Editorial Board of Geochemical Perspectives. She serves on several advisory boards to scientific institutions and on international grant funding panels. Sarah A. Gleeson has broad research interests in mineral deposit genesis, hydrothermal fluid flow and water rock interaction. In recent times her research has been focused on base metal deposits in sedimentary basins, sedimentary geochemistry, diagenesis and ore forming processes.

e-mail: sgleeson@gfz-potsdam.de

John Guven



John Güven graduated from Trinity College Dublin in 1993 with Honours BA in Geology. He spent the larger part of his career as a mining geologist at the Lisheen Zn-Pb mine from 1997 until its closure in 2015. At Lisheen, John was responsible resource extension, definition and estimation and for ensuring maximum extraction of reserves through diligent grade control and mine geology. From 2008 he was also involved with brown and greenfield exploration on the Rathdowney Trend. Since 2015 John has been with iCRAG, based at University College Dublin where he is involved with base metal research, particularly on projects related to the Irish Zn-Pb ore field.

e-mail: john.guven@icrag-centre.org

Dan Kontak



Born and raised in Antigonish, Nova Scotia, I attended St. F.X. for my BSc.(Hons) in geology before leaving pursuing graduate studies elsewhere in Canada. This work was in the area of ore deposit research and focused on large scale metallogenic problems, uranium in Labrador (MSc) and granite-hosted Sn-W granites in the Peruvian Andes (PhD); I have continued this broad approach to ore deposit studies for many decades. After a post-doc stint at Memorial University (1985), I moved to Nova Scotia and worked for the provincial survey (1986-2006) on many ore deposit systems (Sn W, Au, Pb-Zn, Ba, aggregates, zeolites) across a very beautiful province. In 2006 I moved to Laurentian University to assume an academic career where I enjoy the Canadian Shield experience in all respects, both during the hot summers and chilywinters.

e-mail: dkontak@laurentian.ca

Murray Hitzman



Murray Hitzman is Science Foundation Ireland Professor in the School of Earth Sciences, University College Dublin and Director of the Science Foundation Ireland Research Centre in Applied Geosciences (iCrag). He previously served as Associate Director for Energy and Minerals at the U.S. Geological Survey, Charles Fogarty Professor of Economic Geology at Colorado School of Mines, policy analyst in the White House Office of Science and Technology Policy and the U.S. Senate, and exploration geologist conducting mineral exploration worldwide. Hitzman has BA degrees in anthropology and geology from Dartmouth College, an MSc in geology from University of Washington, and a PhD in geology from Stanford University. He currently serves as Technical Advisor for KoBold Metals

e-mail: murray.hitzman@icrag-centre.org

Joe Magnall



Joe Magnall is currently a research scientist at the GFZ Helmholtz Centre in Potsdam (Germany). Joe has a broad academic background, having completed his BSc (Environmental Geology) and MSc (Geochemistry) at the University of Leeds (UK), his PhD at the University of Alberta (Canada), and 7 years as a post-doctoral researcher at GFZ Potsdam. To date, most of Joe's research has focused on investigating sediment hosted mineral systems and developing genetic models for Zn and Cu deposits. This research combines fieldwork with multiple types of petrological, mineralogical, and geochemical datasets. Joe is also passionate about future resource management and how geologists can develop and communicate a balanced narrative on the role of mining in the energy transition.

e-mail: magnall@gfz-potsdam.de

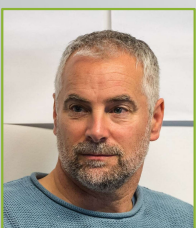
Pouria Mahmoodi



Pouria Mahmoodi is a senior geologist at Nahan Yab Kansar in Tehran, as a geological consulting company. He received his B.Sc in Geology from Shahid Bahonar University, his M.Sc. in Economic Geology from Urmia University, and his Ph.D. in Economic Geology from Tarbiat Modares University, all in Iran. Pouria's studies have focused on genetic models for Jurassic and Early Cretaceous sediment-hosted Zn-Pb deposits in Iran. Specifically, his research is focused on establishing timing of mineralization, relative to the host rocks, and he uses sedimentology, ore textures and characteristics, mineralogy, mineral chemistry, fluid inclusions, and sulfur isotopes to determine this. In order to assist him in these endeavors, Pouria works collaboratively with other researchers around the world.

e-mail: airop1365@gmail.com

Paul McDermott



Paul graduated in 1994 from NUI Galway with a BSc in Earth Science (Geology) and completed his Master's degree in Mining Geology from the Camborne School of Mines in 1995. After completing his studies Paul started work with the Exploration Department of Tara Mines, before moving to BHP World Exploration Inc. based in Dublin. In 1999 he moved to ARCON Exploration plc and was part of the team, headed up by Andy Bowden, which discovered the R Orebody at Galmoy Mines. Paul was promoted internally in 2003 to Chief Mine Geologist at Galmoy Mines Ltd and held several positions within the mine over the next 9 years, including Head of Technical Services and Mine Superintendent. After the closure of the mine in late 2012, Paul joined Aurum Exploration Services Ltd as Principal Geologist, where he worked on a variety of exploration, mining and resource projects. In 2016 Paul took up the post of Senior Geologist with the Exploration and Mining Division of the Department of Communications, Climate Action and Environment. He is currently Principal Geologist in the Licensing Unit of the Geoscience Regulation Office (GSRO). Paul has been an IAEG member since 1996 and a Professional Member of the IGI and EFG since 2004

e-mail: Paul.McDermott@DECC.gov.ie

Eoin McGrath



Eoin McGrath is Head of the Minerals Programme at Geological Survey Ireland. An exploration geologist with a structural background, he did his undergraduate degree at University College Dublin before moving to Norway where he worked with the Norwegian Centre of Excellence - Physics of Geological Processes at the University of Oslo. Having completed a Masters there he moved back to Ireland to work with the Fault Analysis Group at University College Dublin before spending a year working for the Exploration and Mining Division of the Irish government. Following the time in EMD, Eoin then moved into the private sector, working with Aurum Exploration for the best part of the next decade. His work there took him all over the world searching for new mineral deposits. During his time there he worked on a wide range of commodities across a global range of countries from Africa to the Arctic. Since he joined the Survey in 2018 his minerals work has centred on further developing the products available to the minerals industry including a new borehole database, an online core scan library and the Geological Survey Ireland and iCrag update of the IAEG Blue Book. Over the coming years his role will focus on delivering Ireland's response to the European Union's Critical Raw Materials Act.

e-mail: Eoin.McGrath@gsi.ie

Speakers Biopics



Frank Melcher



Frank Melcher holds the position as Professor of Geology and Economic Geology at the Montanuniversität Leoben, Austria. Educated at the universities of Mainz, Innsbruck and Leoben, he has worked for the University of Leoben, the Minnesota Geological Survey and the Federal Institute of Geosciences and Natural Resources (BGR, Germany) before he was appointed to his current position in 2013. His research topics are on metallic and non-metallic mineral deposits, with a current focus on critical metals in Europe and Africa, and development of analytical fingerprinting methods for sustainable supply chains. Frank has published more than 420 papers including 110 in peer-reviewed journals and books.

e-mail: frank.melcher@unileoben.ac.at

Ghazaleh Khan Mohammadi



Ghazaleh Khan Mohammadi is an MSc student in Economic Geology at the University of Tehran, where she also graduated with a Bachelor's degree in Geology in 2021. She ranked first in the nationwide master's degree entrance exam in geology and 6th in Iran's national Earth Science Olympiad. Ghazaleh is a member of Iran's National Elites Foundation (INEF) and ranked in the top 1% of bright students in her MSc program. Ghazaleh has a strong background in geological skills and has participated in field trips with her supervisor. She is fluent in three languages and decided to study economic geology during the second year of her Bachelor's degree. Her MSc research began with IOCG deposits and continued with Iran's Iron-Manganese deposits, which she presented at the University of Tehran. She then became interested in Zinc-Lead deposits and chose to focus her MSc thesis on "Determining the origin and genesis of zinc-lead (copper, barite) of Mehdiabad world-class deposit". She is trying to bring new insight and discoveries into the Mehdiabad deposit.

e-mail: ghazaleh.khanmohammadi@gmail.com

Shubhabrata Mukhopadhyay



Shubhabrata Mukhopadhyay, is the Director, Geological Survey of India,; he completed his post-graduation (MSc.) in Applied Geology from Indian Institute of Technology, Kharagpur and Ph.D. in geology from University of Rajasthan, India. He has professional experience of 28 years and worked extensively in different parts of Rajasthan. A broad area of the Mesoproterozoic Delhi Fold Belt of Rajasthan was mapped and explored by Dr. Mukhopadhyay and was responsible for discovery of Proterozoic stratabound multi-metal (CU-Au-Ag) deposits of Nim ka thana Copper Belt and Mundiawas Khera. He was also instrumental in discovery of Bidasar Ophiolite, located at the contact of Mesoproterozoic Delhi and Neoproterozoic Marwar Supergroup. In recognition for his contributions in Rajasthan geology he was conferred National Geoscience Award (2013) by the President of India. His research interest revolves around base metal mineralisation and at present he is involved in projects related to search of deposits in covered terrains. Dr. Mukhopadhyay conducted IGC 2020 field trip on "Palaeoproterozoic Lead-Zinc-Copper Sulphide Metallogenesis in Aravalli-Delhi Orogenic Belt, South Central Rajasthan". He published several papers in national and international journals and is Associate Editor of Indian Journal of Geosciences.

e-mail: shubhashubho@gmail.com

Finbarr Murphy



Finbarr (Barry) Murphy is a consultant structural geologist and geophysical analyst (trading as Fractore Pty Ltd) who gained undergraduate and Ph. D. degrees at Trinity College Dublin, followed by post-doctoral research at UCD on Caledonian tectonics on IAGC programs and subsequently worked with the Fault Analysis Group in Liverpool University. On migration to Australia, he has been involved in a wide range of mineral exploration projects, with a decade's experience in global zinc exploration. He has championed the application of geophysical worm analysis in geological interpretation and mineral exploration. As Predictive Discovery's Chief Geologist, he was instrumental in the discovery of a "Tier 1" gold asset in Guinea, West Africa. Currently holds a role as Non-Executive Director of ASX listed DeSoto Resources. He has published widely on a variety of geological topics, including on Irish-type deposits, in **high-ranking journals**.

e-mail: fcm@fractore.com

Jan Peter



Jan Peter is a research scientist at the Geological Survey of Canada in Ottawa. He specializes in the fields of economic geology, geochemistry and mineralogy. He has mostly focused on the origin of metallic mineral deposits formed in marine environments, and the development of exploration methods and methodologies for them. These deposits include volcanogenic massive sulphides, sediment-hosted lead-zinc, and metalliferous black shales. He is currently focused on researching the distribution and controls within base metal deposits on so-called critical minerals that are needed for the green and digital economy and the transition to clean energy.

e-mail: jan.peter@NRCan-RNCan.gc.ca

Abdorrahman Rajabi



Abdorrahman Rajabi is an assistant professor at the University of Tehran (Iran). He completed his B.Sc. (geology) at Ferdowsi University (2005), and his M.Sc. (Economic Geology) and Ph.D. degrees (2012) at the Tarbiat Modares University (Iran). Rajabi's research is primarily focused on a better understanding of shale-hosted massive sulphide deposits and the metallogeny of sediment-hosted ore deposits of Iran, and the parameters that control the formation of these deposits. In addition, Rahman is working on the Metallogeny of Iron oxide-apatite deposits and typically enjoys combining field geology, and exploration techniques.

e-mail: rahman.rajabi@ut.ac.ir

Speakers Biopics



Pat Redmond



Patrick has over 30 years of experience in international mineral exploration and the mining industry and has a track record of value creation through exploration and discovery in multiple jurisdictions and across a range of commodities and ore deposit styles. He is currently Senior Vice President, Exploration and Geoscience with Copper Mountain Mining and is based in Vancouver. Prior to joining Copper Mountain, he was Vice President of Exploration with KoBold Metals, where he led an integrated team of geoscientists and data scientists in developing innovative data-science and machine learning tools for exploration. Prior to that, he worked for Teck Resources for over 12 years in various senior exploration roles, including General Manager, Exploration – the Americas, and Technical Director, Geoscience Services. In 2006 he opened the Teck exploration office in Ireland and the following year the Ireland exploration team discovered the Stonepark Deposit in Limerick. Patrick received his Ph.D. in Geological and Environmental Sciences from Stanford University, his M.Sc. in Geology, and B.A. (Hons) in Earth Sciences from Dublin University, Trinity College. Patrick is a P.Geo. and EurGeol and an adjunct professor at both University College Dublin and Trinity College.

e-mail: redmond@stanfordalumni.org

Neal Reynolds



Neal has 30 years' experience in geology including project generation and management; project audit and optimisation from exploration to resources; exploration models and targeting studies; independent and expert reporting; and project due diligence. Neal has specialist expertise in integrated targeting of mineral systems for exploration and resource optimisation, integrated with orebody knowledge and metallurgical evaluation. His experience encompasses sediment-hosted base-metals, VHMS, skarn/manto, porphyry, and epithermal systems, incorporating lithostratigraphic, structural and alteration evaluation, logging and data analysis. Neal also has a strong background in structural geology; lithostratigraphy, sedimentology and basin analysis; and supergene mineralisation processes.

e-mail: Neal.Reynolds@erm.com

Mike Russell



Being born in London in 1939 meant Mike lived "here, there and everywhere" in England. Thus footloose, he always wanted to be an explorer and never yearned for home. Arctic Norway was his first taste, out of Queen Mary College, London. Then the Solomon Islands where he was "adopted" (named Takiri) by a Gilbertese family, and where he could watch, feel and take some responsibilities for geological reality happening beyond the classroom. Thence to British Columbia and the Yukon prospecting for Falconbridge Nickel – "if you want to know how the land lies, get down the mine!" Thence to Durham University and Ireland for his PhD. Sir Kingsley Dunham was his nominal supervisor, but his true supervisors were the survey and exploration geologists he met there. Thereafter he had much help from the Mogul mine geologists at Silvermines. Mike moved to Glasgow University and then Scottish Universities Research and Reactor Center where he continued his research on Ireland. Leaving Glasgow, he was hired by NASA's Jet Propulsion Laboratory in Pasadena where, as a principal scientist in the Astrobiology section he was free to develop the Alkaline Vent Theory for Life's emergence – a theory inspired by field work and exploration in various base metal mines in Ireland. Mike retired to Italy in 2019 where he is affiliated to several Universities there as he continues his work on the "AVT"! A longer bio, "Prospecting for Life" was published in 2019 by the Royal Society, *Interface Focus* 9: 20190050.

e-mail: michaeljrusell80@gmail.com

Licia Santoro



Licia Santoro is a researcher at the Torino University (IT) where she holds lectures on Economic Geology and Ore deposits. She gained the "European-PhD" in 2015 at the Napoli University (IT) collaborating with C-S-M (UK). After, she worked as research-teaching-scholar at Liège University (BE) (EMERALD programme) and joined the NHM of London (UK) as post-doc and MC-IR fellow. Licia's career was dedicated to ores characterization using AM systems and CRMs department in supergene (laterite, bauxite, non-sulphides) and hypogene (MVT, SEDEX) deposits. Currently she is working on Alpine REE-hosting ores, 5-elements vein systems and graphite deposits.

e-mail: licia.santoro@unito.it

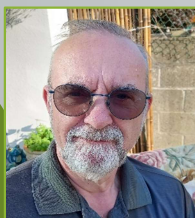
Paul Slezak



Paul is an Irish Research Council Government of Ireland Postdoctoral Fellow conducting work in the iCrag raw materials research challenge. They have a BSc from New Mexico Tech (USA), an MSc from Queen's University (Canada), and a PhD from James Cook University (Australia). Prior to their PhD, Paul previously worked in the geological/geotechnical engineering and mining/mineral exploration sectors. They specialise in critical metal resources and using rare earth element (REE) trace element and isotope chemistry in different rocks to establish petrogenesis and relationships to mineralisation. Past works include the carbonatite hosted Yangibana LREE deposit (Western Australia), the alkaline basalts and base metal mineralisation (Co. Limerick), and hyperspectral analysis of the Mourne Mts (Co. Down). They are currently the primary investigator working on critical element department and petrogenesis of the Mourne Mts, the Pajarito Mt agpaic complex (New Mexico), and the carbonatite-associated Mt Pass Mine (California).

e-mail: paul.slezak@ucd.ie

Gerry Stanley



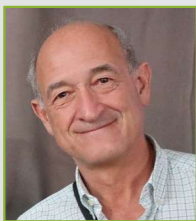
Gerry Stanley has a BSc in geology from UCD, an MSc in geology from Acadia University in Nova Scotia, Canada and a second MSc in Mining Engineering from the Camborne School of Mines in the UK. He is a retired geologist having spent nearly 40 years in both industry (mineral exploration and development mainly in Ireland) and as a government geologist in Geological Survey Ireland (GSI). When he retired, in 2018, he was Head of the Minerals Programme in GSI where he was responsible for minerals databases; minerals research; and representation at the European Union where he was Chair of the group on the inventory of mine waste in Europe, and EuroGeoSurveys where he was Deputy Head of the Minerals Resources Expert Group. He is an Honorary Member of the Irish Association for Economic Geology (IAEG) and is a past-President of both the IAEG and the Institute of Geologists of Ireland. working on a history of mineral exploration and development in Ireland since 1940.

e-mail: gerrystanley30@gmail.com

Speakers Biopics



Fernando Tornos



Fernando Tornos is currently Professor of Research at the Consejo Superior de Investigaciones Científicas (CSIC, Spain) and Adjunct Professor at the Lulea Technological University, Sweden, and Memorial University of Newfoundland, Canada. His main topic of research is the geology and geochemistry of hydrothermal ore deposits including isotope geochemistry, geochronology and development of conceptual models for exploration.

e-mail: f.tornos@csic.es

Jamie Wilkinson



Jamie Wilkinson was born in the United Kingdom and educated at Cambridge (BA) and Southampton (PhD) followed by postdoctoral research at Imperial College London. Subsequently, he became a member of faculty at Imperial and is now a full Professor of Geology, teaching field geology, geochemistry and economic geology. In 2014, he partly relocated to the Natural History Museum to become Research Leader in Mineral Deposits and Director of the London Centre for Ore Deposits and Exploration (LODE). Jamie has extensive experience of sediment-hosted Zn-Pb deposits, particularly in Ireland (co-authoring 16 papers on the district) and has written a major review of sediment-hosted deposits, published in the Elsevier *Treatise on Geochemistry*.

e-mail: J.Wilkinson@nhm.ac.uk

Peter Wojcik



Peter joined Wood Mackenzie as a research analyst in 2019 focusing on zinc and lead mine costs and supply. Prior to joining Wood Mackenzie, Peter spent 7 years in the mining and exploration sectors based in West Africa, Oceania and Europe. His roles focused primarily on base and precious metals. He holds a BSc in Geology from the University of Southampton and an MSc from the University of Leeds. He is a member of the Australian Institute of Geoscientists and Fellow Geological Society of London.

e-mail: Peter.Wojcik@woodmac.com

Lola Yesares



Lola Yesares graduated with her Degree and PhD in Geology from University of Huelva, Spain. Since then, she has held a post-doctoral position at iCRAG, University College Dublin and currently works as lecturer at the Department of Mineralogy and Petrology at the University Complutense Madrid. In addition to her research commitments, she lectures Mineral Deposits within the framework of three Master's degrees in Spain, including "Exploración de hidrocarburos y recursos minerales" (University Complutense of Madrid), "Geología y gestión ambiental de los recursos minerales" (and "Geología aplicada a los recursos minerales y energéticos" (University of Granada). Since 2008, Lola has been involved in different collaborative projects between academy and mining industry focused on the metallogenesis of both high-tech and critical metals mineralizations in several world class mining districts. Her research interests include geological processes involving hydrothermal and supergene deposits, from nano to global scale and the study of the mineralogy, elemental and isotopic geochemistry through advanced micro-analytical tools. Specializing on the study of massive sulphide deposits from the Iberian Pyrite Belt, she focused on the genesis of precious metals mineralization as well as the development of gold recovery methods. The scope of her research activity was also extended to other metallogenic provinces, including the Zambian Copper Belt and Navan (Ireland).

e-mail: myesares@ucm.es

Lingli Zhou



Dr Lingli Zhou is an Assistant Professor at VU Amsterdam in the Netherlands. Her recent research focuses on energy critical metals, using mineralogy and geochemistry tools to understand the formation of critical mineral deposits and assess the potential of reusing mine tailings. She completed her Ph.Ds in Economic Geology at the Chinese Academy of Sciences (2014, China) and in Applied Mineralogy and Sedimentology at Aarhus University (2015, Denmark), and continued her career in geosciences as a Research Associate at Trinity College Dublin (2015-2019, Ireland) and University College Dublin (2019-2022, Ireland), funded by the Science Foundation Ireland Research Centre in Applied Geosciences (iCRAG) and Geological Survey Ireland. She has led projects on energy critical metals associated with carbonate-hosted Pb-Zn deposits in China and Ireland and on sedimentary rock-hosted Cu-Co deposits in Africa.

e-mail: l.zhou@vu.nl



IAEG Past Presidents

No.	Year	Name	Status
1	1974	Jim Patterson	Canada
2	1975	Eamonn Grennan	Ireland
3	1976	Viv Byrne	Ireland
4	1977	John Clifford	Ireland
5	1978	Peter Cazalet	Ireland
6	1979	Andy Meldrum	RIP
7	1980	Gareth V Jones	RIP
8	1981	Tony Poustie	Australia
9	1982	Ken Chew	RIP
10	1983	John Pyne	Ireland
11	1984	Christian Schaffalitzky	Ireland
12	1985	George Emo	RIP
13	1986	John Ashton	Ireland
14	1987	Adrian Black	Australia
15	1988	Andy Bowden	Ireland
16	1989	Mike Boland	Ireland
17	1990	Garth Earls	Ireland
18	1991	Loreto Farrell	Ireland
19	1992	Garth LI Jones	Ireland
20	1993	Jim Geraghty	Ireland
21	1994	Iain Legg	RIP
22	1995	Annraoi Milner	Ireland
23	1996	Kerr Anderson	RIP
24	1997	Eibhlín Doyle	Ireland
25	1998	John Morris	Ireland
26	1999	Leo Fusciardi	Canada
27	2000	John Ashton	Ireland
28	2001	Stephen Harney	Ireland
29	2002	Mike Lewis	RIP
30	2003	Gerry Stanley	Ireland
31	2004	Colin Andrew	Ireland
32	2005	Koen Verbruggen	Ireland
33	2006	Vincent Gallagher	Ireland
34	2007	Sandy Archibald	Canada
35	2008	Patrick Redmond	Canada
36	2009	John Colthurst	Ireland
37	2010	Kevin McNulty	Ireland
38	2011	Kevin McNulty	Ireland
39	2012	Graham Parkin	Ireland
40	2013	Mark Patton	Ireland
41	2014	Noeleen Fox	Ireland
42	2015	Roy Coates	Ireland
43	2016	Matthew Mawson	Sweden
44	2017	Orla McKenna	Ireland
45	2018	Andrew Murrells	Ireland
46	2019	Kieran Parker	Ireland
47	2020	Finn Oman	Ireland
48	2021	Shane Lavery	Ireland
49	2022	Lynne Doyle	Ireland
50	2023	Ally Barrow	Ireland