

# **IRISH GEOSCIENCE NETWORK**

## **ORGANISATION REPORTS 2022**

**Meeting held**

**2<sup>nd</sup> March 2022 on Zoom**

***Report compiled by IGI***



**Members of the Irish Geoscience Network (IGN)**

- Trinity College Dublin, Department of Geology (TCD)
  - University College Dublin, School of Earth Sciences (UCD)
  - University College Cork (UCC)
  - National University of Ireland, Galway: Earth and Ocean Sciences (NUIG)
  - Geological Survey Ireland (GSI)
  - Geological Society – Northern Ireland Branch (GeolSocNI)
  - Geological Survey of Northern Ireland (GSNI)
  - Irish Association of Economic Geologists (IAEG)
  - Geotechnical Society of Ireland
  - Irish Geological Association (IGA)
  - Institute of Geologists of Ireland (IGI)
  - International Association of Hydrogeologists Irish Group (IAH)
  - National Museum of Ireland (NMI)
  - Royal Irish Academy (RIA), Geosciences and Geographical Sciences Committee
  - Irish UNESCO Global Geoparks
  - Geoscience Ireland (GI)
  - Irish Mining and Quarrying Society (IMQS)
  - Irish Quaternary Association (IQUA)
  - Petroleum Infrastructure Programme (PIP)
  - Open University Geological Society Irish Branch (OUGS)
  - Ulster Museum
  - Dublin Institute of Advanced Studies (DIAS)
  - Department of Environment, Climate and Communications: Geoscience Regulation Office
  - Department of Environment, Climate and Communications: Geoscience Policy Division
  - Irish Brownfield Network (IBN)
  - Irish Centre for Research in Applied Geosciences (iCRAG)
  - Irish Geomorphology Group (IGGy)
  - European Association of Geoscientists and Engineers (EAGE)
  - Irish Association of Women in Geoscience
  - Speleological Union of Ireland
  - Soil Science Society of Ireland
  - Geothermal Association of Ireland (GAI)
  - Girls into Geoscience Ireland
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**Contributors to this report**

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  - Department of Environment, Climate and Communications: Geoscience Regulation Office
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### **An overview of activities by the Institute of Geologists of Ireland (IGI)**

The Institute of Geologists of Ireland (IGI) was established in 1999 with the mission of promoting and advancing the science of geology and its professional application in all disciplines, especially the geosciences and to facilitate the exchange of information and ideas in relation thereto. IGI Members are required to uphold, develop and maintain the highest professional standards in the practise of their profession. To this end all members must undertake CPD recording for approval on an annual basis.

The IGI was established and is maintained with the support of our sponsoring bodies, the Irish Association for Economic Geology (IAEG), the Irish Mining & Quarrying Society (IMQS), Geophysical Association of Ireland (GAI), Geotechnical Society of Ireland (GSI), and the International Association of Hydrogeologists (Irish Group, IAH). The IGI has Mutual Recognition Agreements with many of the largest geoscience organisations across the world and is part of the European Federation of Geologists through which it can award the EurGeol title.

Professional membership of the IGI is open to all practising geoscientists who meet the required standards of qualification and experience. For information on how to apply, please visit [www.igi.ie](http://www.igi.ie).

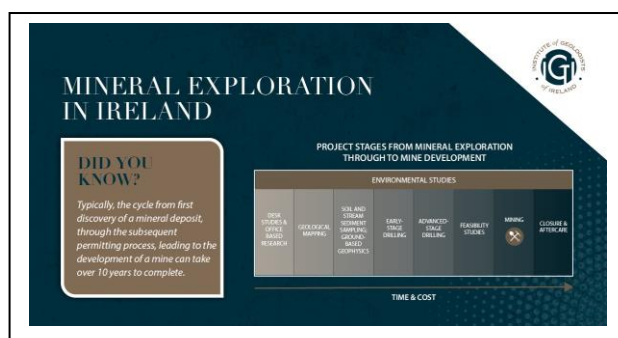
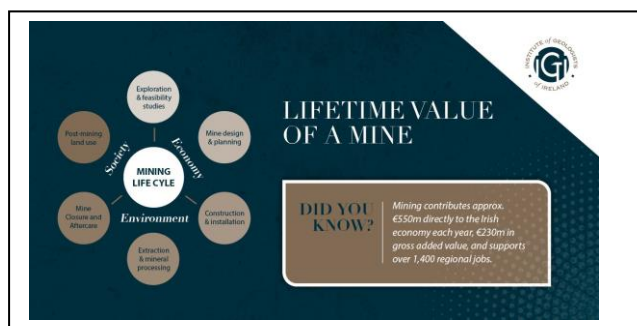
### **IGI Activities since the last IGN meeting, March 2021**

#### **Minerals Information Factsheets**

In March 2021 a significant body of work from the Minerals Information Working Group (MIWG) was published in IGI's first major public engagement campaign. IGI engaged the services of a PR firm and was delighted that a number of IGN members was represented on the MIWG.

Five science-led factsheets on minerals and mining in Ireland were published on 8<sup>th</sup> March 2021. The programme of dissemination has resulted in wide-ranging interest in the materials, including coverage in the Irish Times, an interview on the Newstalk radio Pat Kenny show, upcoming feature on RTE Radio 1 current affairs program (Philip Boucher-Hayes) engagement from public officials and representatives and messages of support from national and international geoscience organisations. The factsheets had five themes: mining and our green future, the lifetime value of a mine, mining through the ages, mine planning and environmental regulation and mineral exploration in Ireland. The graphics below give a brief snapshot of the factsheet contents. For more information on the factsheets please visit our website <https://igi.ie/committees/minerals-information-working-group/>

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The MIWG plans to continue building on the momentum of the factsheets. A wider stakeholder meeting is planned for March 2022 to discuss area of common interest and look at planning relevant events for later this year. For further information on this meeting should you wish to get involved please contact the office at [info@igi.ie](mailto:info@igi.ie).

### Practical Geo-communication Course (Jan 2021 – Jan 2022)

IGI licensed Geologize's course 'Practical Geo-communication' which was free to avail of for all IGI members for one year. This is an online course which teaches geoscientists to bring the public to a greater understanding and appreciation of our planet through effective and powerful communication.

### EIAR & AA Course (May 2021)

The IGI engaged the services of CMG Training to deliver two online training courses on Environmental Impact Assessment and Appropriate Assessment screening. Both courses were free to members and are outlined below.

#### Course 1: Introductory Course:

The introductory course is aimed at IGI members who are new to or have a limited understanding of EIA and AA screening. While the course will cover the full EIA and AA processes, it will

concentrate on the screening stages of both and look at the implications of recent case law on screening.

#### *Course 2: Advanced Course:*

The advanced course is aimed at IGI members who prepare Environmental Impact Assessment Reports and Appropriate Assessment Reports. The course will assume an understanding of both processes and will look at increasing your understanding of recent case law and its implications.

#### **AGM 2021 – June 2021**

The second online AGM of the IGI was held on 16th June 2021. It was well attended and had c. 30 attendees. The video of the AGM is hosted on the IGI website.

#### **Updated to IGI Summary Guide to Public Reporting for Mineral Companies in Europe**

The IGI produced an update (3<sup>rd</sup> Edition) to the summary guide to the PERC Reporting Standard. The guide is available on the IGI website.

#### **American Institute of Professional Geologists – Mutual Recognition Agreement**

The IGI were delighted to sign a new MRA with the AIPG during 2021. This previous IGI Board (2020 – 2021) undertook significant work to progress this agreement. It is founded on the principals and aims of both organisations, the application process and CPD programmes. The mutual recognition of professional qualifications, the American Institute of Professional Geologists' Certified Professional Geologist (CPG) and the Institute of Geologists of Ireland's Professional Geologist (PGeo) shall now be recognized as comparable between the two organizations in affording its respective CPG and PGeo members discretionary privileges with each of the organizations. The importance of such agreements cannot be overstated given the international nature of geological practice.

#### **Consultation Responses**

During the last year the IGI maintained its public profile on a number of fronts, in line with the 2019-2024 strategy. We responded to a number of issues concerning geoscience in Ireland through the year via public consultations or direct representations:

- Dept. of the Environment, Climate and Communications Geothermal strategy consultation
- Dept. of Housing, Local Government and Heritage (DHLGH) – Nitrates Public Consultation
- PEACE PLUS consultation
- All Ireland Climate and Biodiversity Action Plan (AICBRN)
- Dept. of the Environment, Climate and Communications: Climate Action Plan 2021 - Call for Expert Evidence
- Dept. of Environment, Climate and Communications Public consultation of SEA Scoping on the draft Policy Statement on Mineral Exploration and Mining in Ireland

The IGI also took part in a stakeholder Townhall meeting on the DECC's consultation on the draft Policy Statement on Mineral Exploration and Mining in Ireland in October 2021.

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## **The IGI Working Groups:**

**IGI Validation Committee:** The Validation Committee continued to be very busy throughout 2021 with a continued growth in membership applications. The committee interviewed 29 candidates for professional membership, and approved 27 new professional members (PGeo) and 22 Members-in-Training (MIT). It is wonderful to see such growth in our membership.

**Contaminated Land Committee:** This working group was set up to deal with matters arising in relation to Contaminated Land which would have an impact on our members in line with the overall IGI Strategy. They are also responsible for the maintenance and review of the IGI's Register of Professionally Qualified Geoscientists / Competent Persons (in respect of environmental risk assessment for regulated and unregulated waste disposal and contaminated land). This group typically meet twice a year.

**Environmental Impact Assessment Reporting Working Group:** A working group was set up in 2019, now comprising 6 people, following on from a call to the IGI membership for volunteers. It includes members from public service and industry, with a range of experience across the areas of the guidance. The existing IGI guidance needs updating, to reflect changes in the environmental impact assessment procedures and reporting, arising from an amendment to the EU EIA Directive (EU Directive 2011/92/EU and its subsequent amending Directive 2014/52/EU) in so far as they apply to the soils, geology and water elements of the environment.

**Minerals Information Working Group:** The IGI convened a Minerals Information Working Group in early 2020. The group has the following objectives:

- a) To address the growing trend of misinformation about mining and exploration on the island of Ireland;
- b) To provide factual information on mining and exploration on the island of Ireland to all stakeholders, including the media, various interest groups and the general public.

The group consists of 21 expert mineral exploration, mining and environmental geologists across the island of Ireland. The Minerals Information Working Group have produced a series of informational materials available below which will be launched in the coming week.

**Energy Geologists Working Group:** In 2021 the IGI established an Energy Geoscientists Working Group, to raise awareness of the geoscientist's roles in the energy sector; and to support geoscientists and petroleum geologists so that their skills and experience can be applied to achieving a Just Energy Transition for Ireland. The EGWG will help the IGI develop initiatives that will support energy geoscientists to harness opportunities and cope with career challenges associated with the energy transition, e.g. tailored training, networking opportunities, highlighting the importance of geoscientist with regard to the mix of energy types (fossil, transition and renewable), the transfer of skillsets to other sectors, promotion of energy geoscience, collaboration and information sharing. The group is made up of both IGI members and non-members who work in the fields of petroleum, exploration, consultancy, renewables, research and academia. Members are based in Ireland, UK and the USA. The board range of expert skills and global perspectives provides a rich wealth of knowledge in energy geoscience. The group aims to progress a number of initiatives in the coming year.

**Equality, Diversity and Inclusion Committee:** IGI has recently formed An Equality, Diversity and Inclusion (EDI) Committee with the objective of promoting and increasing equality, diversity and

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conclusion among IGI members and in the broader geoscience profession. These objectives are strategic objectives of the IGI for the period 2019-2024 and beyond. The current initiatives include developing and publishing an EDI Charter for the IGI, provision of supports (e.g. mentoring, financial, information, advocacy) for geoscientists or those looking to study geoscience from marginalised, disadvantages or underrepresented groups and raising awareness of EDI issues.

Thus far, the committee has made progress on a number of these, through the following activities: provision of a four-year bursary to U.C.C. to support a student in the geosciences, who would otherwise face potentially multiple barriers to obtaining third level education in the geosciences, provision to members of Unconscious Bias CPD training which IGI sponsored as part of the iCRAG EDIG project conference, continuing support of iCRAG's EDIG project through sponsorship and representation. In addition IGI is developing links with organisations already expert in the field of EDI so that we can better inform ourselves on how we can improve equality and diversity. IGI have formed a partnership with Recruit Refugees and we are currently finalising plans for a Driving Licence Bursary to be launched in the coming months.

**Heads of Geoscience Group (HOGGs)** The IGI continues to facilitate collaboration in the geoscience community, through convening the Heads of Geoscience Groups forum, which met 4 times through the year. The IGI wishes to thank all participants who have given up their time during the year to make sure that the geoscience community in Ireland is connected and working together.

The IGI acknowledges the continued support of our sponsoring bodies, the Irish Mining & Quarrying Society (IMQS), Geophysical Association of Ireland (GAI), Geotechnical Society of Ireland (GSI), Irish Association for Economic Geology (IAEG) and the International Association of Hydrogeologists (Irish Group, IAH).

**EurGeol Cian O'Hora PGeo**  
**IGI President**

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The IAEG annually organises a lecture series, conference and short courses aimed at industry professionals, academia and students. Its membership is made up from geoscientists working in Ireland and internationally

## **2021 Programme**

Event	Date	Location	Title
Lecture Series	4 <sup>th</sup> May	Virtual via GoogleMeet	<b>Magnesite Types and Mines in Austria</b> <i>Christoph Stranzl – RHI Magnesita</i>
Lecture Series	18 <sup>th</sup> August	Virtual via GoogleMeet	<b>Supporting Responsible Exploration - A Role for the IAEG</b> <i>John A Clifford</i>
Online Conference	13 <sup>th</sup> + 14 <sup>th</sup> October	Virtual via Zoom	<b>Ireland: Mineral Potential of the Emerald Isle</b> <i>in collaboration with the Ore Deposits Hub</i>
AGM	16 <sup>th</sup> December	Virtual via GoogleMeet	<b>AGM</b>

The IAEG are pleased to be able to resume hosting in-person events this upcoming year and look forward to inviting our members back to our Lecture Series, which is in the process of being finalised, along with student courses and the return of our Annual Conference this May.

Our first lecture, '**Copper in Europe – Production, Demand, Potential and Challenges**', presented by John A Clifford, will take place on March 24<sup>th</sup> in the Pillo Hotel in Ashbourne. The IAEG will be maintaining the virtual attendance option (speaker permitting) for any in-person talks, in order to allow members further afield to attend.

The highly anticipated IAEG decennial conference, entitled *Minerals 2020: Europe's Past, Present & Future*, initially set to take place in 2020, unfortunately did not come to pass due to extended restrictions relating to social gatherings. Plans for a decennial conference will now be amalgamated with the IAEG **50<sup>th</sup> Anniversary Conference**, set to take place next year in 2023. The formation of a new planning committee is underway and there will be more details to follow about this celebration in due course.

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## UCD School of Earth Sciences

## Scoil na Domaneolaíochtaí UCD

UCD Science Education and  
Research Centre (West),  
University College Dublin,  
Cliaith,  
Belfield, Dublin 4, Ireland

Ionad Léann agusThaighde  
Eolaíochta UCD (Iarthar),  
An Coláiste Ollscoile, Baile Átha  
Belfield, Baile Átha Cliath 4, Eire

Email: [geology@ucd.ie](mailto:geology@ucd.ie)  
Web: [www.ucd.ie/earthsciences/](http://www.ucd.ie/earthsciences/)  
Twitter: @UCD\_Geosciences

Another busy year with research continuing apace despite the restrictions imposed by the Covid-19 pandemic. A subset of publications during the reporting period covered topics as diverse as atmospheric dust records, the impact of salt on the structural evolution of Ireland's offshore basins, geoscience applications of machine learning and neural networks, geomodelling, and carbon cycling and burial. As the first phase of iCrag had finished, it was a busy year for PhD completions with 9 students completing their doctoral work.

The second six-year phase of iCrag commenced January 2021 with a focus on Earth system change, the energy transition, access to critical raw materials, and the interface between geoscience and social sciences. iCrag themes coincide with a shift in school research priorities to the geoscience underpinning the UN sustainability goals. The school was successful under the HEA 2021 SALI (Senior Academic leadership Initiative) initiative and aims to recruit a Full Professor in Sustainability Geoscience in 2022.

The year saw the last PIP-supported projects which were used to kick-start some of the iCrag energy transition work in the school dealing with offshore carbon sequestration and storage, shallow sea-bed conditions and flow modelling. In parallel, efforts to further geothermal energy research have accelerated. A new research group focussing on all aspects of Sustainable Geoenergy has been launched, led by Dr Kara English who has joined the school from PAD as an Assistant Lecturer. A new Geohazards Research Group was also established reflecting the growing focus on remote sensing and insights from numerical and analogue modelling. The school now has advanced capabilities for the application of Interferometry of Synthetic Aperture Radar (InSAR) to monitor ground displacement from satellites, an initiative led by Dr Eoghan Holohan. Dr Julian Menuge has been co-leading GREENPEG, an EU Horizon 2020 project (2020-2024) that is integrating geophysical and geochemical methods to explore for rare metal and other pegmatites in Europe. The project has an important component addressing social licence. Dr Sam Kelley co-leads a new UCD interdisciplinary Mountain Research Group with UCD Archaeology and Geography schools; this group is addressing the wider significance of mountain landscapes. In another highlight, Assistant Professor Dr Weimu Xu was aboard the JOIDES Resolution in August for IODP Expedition 396 "Mid-Norwegian Margin Magmatism and Paleoclimate Implications". The samples acquired will be used for palaeobotanical and geochemical analysis to better constrain carbon degassing associated with the volcanism and the implications for changing atmospheric conditions, enhanced hydrological cycles and global weathering rates.

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Activity in the NCIG labs at UCD continued albeit at reduced level using pods during the pandemic. Work commenced on setting up a new lab for cosmogenic isotope dating, and in a joint initiative between UCD Earth Sciences, UCD Geography and GSI, the UCD Itrax XRF core scanner is being upgraded to allow state-of-the-art rock and soft-sediment core characterisation.

In terms of teaching operations, 2021 was another year heavily impacted by pandemic restrictions, but with some easing in Q4 with the return of students to campus and face-to-face teaching. Prior to this, teaching was dominantly online, including virtual field courses, and required additional staff effort and upskilling. A positive outcome has been the acquisition of new digital outcrop models (see <https://sketchfab.com/EarthScienceUCD>) and data that can augment traditional field courses as they return. With due care, it also proved possible to safely run day trips from Dublin during the lockdowns, so elements of field training were retained. Level 4 students were able to undertake a traditional 5-week mapping project in west Cork in September with no issues.

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Geoscience Ireland (GI), the cluster supporting Irish companies to win business overseas is undergoing a transition from a project hosted by GSI to a stand alone network with anticipated support by Enterprise Ireland. The transition to a Company Limited by Guarantee will complete by mid April 2022 at which time GI will relocate to the iCRAG offices in UCD. The transition has resulted in staff reduction during 2021, Andrew Gaynor and Stephen Walsh having left their positions.

An independent Review of the GI Project by Indecon Economic Consultants was received in October 2021 which concluded that the Project is an exemplar of a successful business cluster, delivering significant job creation support and networking opportunities to its members. Member companies have demonstrated great resilience in the face of Covid 19, reporting sustained or increased turnover and job creation.

GI continues to support the Geo Drilling Apprenticeship delivered by IT Carlow., now entering its third intake. GI will continue its involvement with the EU Geothermal Energy Europe 2 (GEEE2) Project, with GSI taking over leadership of GEE2. GI looks forward to the resumption of in person Trade Missions and Market Study Visits later in 2022, including PDAC, Mining Indaba, Offshore Wind (EI) and GEOMATT.

**Sean Finlay**

Business Development Director  
Geoscience Ireland  
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### **IGN Report: Earth & Ocean Sciences at NUIG 2021 (February 2022)**

Earth and Oceans Science at NUIG had a successful 2021 as we adjusted to the second year of the pandemic. Academics and researchers published papers in international journals, PhD students successfully completed their projects and new researchers were recruited, the research projects EOS lead and contribute to continue to grow and develop, and we began the recruitment process for a permanent lectureship in Economic Geology.

Undergraduate teaching was online in the early part of the year, but was back in person/online from September. Labs and practicals were in person, but fieldwork modules and residential field trips were shelved for the second year. We refined the virtual field trips making them more blended in approach (staff collected samples that were shared with students, and took gigapan images and videos from discrete outcrops that helped mapping).

In 2021, there were nearly 100 full time students in the denominated EOS degree programme, and the first year intake in September 2021 was up again on previous years. This reflects our location in the west of Ireland, but also it reflects the success of the Girls Into Geoscience programme, and a number of the outreach events run through iCrag, which have increased awareness of geosciences in secondary schools (and among secondary school parents).

Major new research collaborations involving EOS staff got under way:

- Work got underway on an SEAI-funded project on Carbon Capture, Use and Storage, in collaboration with Mechanical Engineering at NUIG and the University of Liverpool, to address CCUS issues in an Irish context;
- EOS is part of the EU Horizon 2020 Geofit Smart Geothermal and in 2021 we completed planning for 16 c.150 deep boreholes that will be used to abstract heat for the Alice Perry Engineering Building and the NUIG swimming pool;
- SFI funded an EOS-led project working on water resource resilience associated with undisturbed blanket bog. In the tripartite SAPHIRE project EOS academics and researchers will work with academics and researchers from QUB and Ohio State University (funded by SFI, the UK Government, and the National Science Foundation);
- A team from Civil Engineering at NUIG and EOS, working with Teagasc, secured Department of Agriculture, Food and the Marine funding for the REWET project.

Chief Technical Officer Sheena Fennell is part of the Green Labs initiative and thanks to her focus, enthusiasm and encouragement, all of the EOS research and teaching labs are now accredited.

At the online IGRM event (hosted by Mary Immaculate College in February), the top prize for best poster was shared by two EOS final year students: Amy Benaim and Avery Fenton. Later in the year, Avery was also announced as joint winner of the GSI Cunningham Prize for her project on Mississippian (Serpukhovian) microvertebrate fish fossils from St Brendan's Well, County Clare.

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The University approved our request to recruit a permanent lecturer in Economic Geology and that process was completed toward the end of the year, and we're looking forward to a new member of staff joining EOS in 2022. And, like most of us, we're looking forward to a return to the field and to fieldwork in 2022!



Tiernan Henry: Head of EOS

Earth & Ocean Sciences  
School of Natural Sciences



NUI Galway  
OÉ Gaillimh

## **iCRAG Activities in 2021: IGN 2022 submission**

iCRAG, the SFI Centre for Research in Applied Geosciences, though based in UCD includes researchers from eight other institutions around the island. iCRAG researchers are collaborating with partners in industry and government to create solutions for a sustainable society by addressing three main challenges: Earth system change, Earth resources, and Earth science in society. This work is underpinned by cross-cutting expertise and technology in geochemistry, geodata, geomodelling, geophysics, and geosensing.

iCRAG marked a major milestone on 1 February 2021 when Minister Simon Harris announced an investment of €28 million in the second six-year phase of the Centre. The Minister's decision was based on an intensive review of the Centre's performance from 2014 to 2020 and its plans for 2021-2026. This funding is a significant vote of confidence in Irish geoscience and a tribute to the work of the more than 160 researchers and staff associated with the Centre to date.

During 2021, the Covid-19 pandemic continued to disrupt field work, lab work, and meetings of all types. Despite these limitations, 2021 was a busy and productive year for research, funding, collaborative activities, and PhD graduations across the Centre.

During May 2021, iCRAG researchers Ben Couvin, Niamh Faulkner, Dr. Haleh Karbala Ali and Erica Krueger took part in the PORO-CLIM expedition aboard the RV Celtic Explorer, which focussed on surveying the seabed beneath PORcupine and ROckall basins to measure the pace of deep-time CLIMate change. In March 2021, iCRAG researchers Andy Trafford, Dr. Mark Coughlan and Dr. Shane Donohue completed an offshore investigation in Dundalk Bay aboard the Celtic Voyager to assess the feasibility of a novel fibre-optic approach to carrying out offshore site investigations for windfarm developments in the Irish Sea. The team aims to develop the use of fibre optic cables to rapidly acquire seismic data over considerable distances (km scale), which if successful could prove a game changer in the field of marine site investigations.

Drs. Florian Le Pape, Chris Bean, and David Craig, researchers at DIAS, published a paper in Nature, "How deep ocean-land coupling controls the generation of secondary microseism Love waves", which was also featured in the Irish Times.

The ramp up of new research projects for the second phase of iCRAG began in 2021, including a continuation of our collaboration with CERN investigating distributed fibre optic sensing and deep learning-based photogrammetric analysis of ageing underground infrastructure and with Transport Infrastructure Ireland (TII) on the monitoring and modelling of mechanical behaviour of Dublin Tunnel.

Dr. Nick Vafeas completed his SFI Public Service Fellowship at the Oireachtas Library & Research Service where he studied the potential of geothermal energy in Ireland and the

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policies surrounding its development. His report was published in the Library & Research Service Spotlight series.

iCrag is a founding member of the All-Island Climate and Biodiversity Research Network (AICBRN), which was launched by the Taoiseach, Micheál Martin, and the Deputy First Minister of Northern Ireland, Michelle O'Neill, in November. The Network is a key initiative from the academic community to bring together experts from multiple disciplines across the island of Ireland to undertake the research necessary to address the climate and biodiversity emergencies.

Online events, while frustrating at times, dominated the year and opened new avenues of engagement with the global geoscience community. Researchers presented their work virtually at many events including EGU, Goldschmidt Conference on Geochemistry 2021, Ore Deposits Hub, and the Society of Economic Geologists Annual Meeting (Whistler, B.C.). Prof. Murray Hitzman, iCrag Director, led a session at the AERAP Africa-Europe Science and Innovation Summit in June and addressed the UNGA76 Science Summit in September. iCrag “exhibited” at the AME Roundup, Prospectors and Developers Association of Canada, and at the European Geophysical Union meeting.

In December, iCrag hosted *iCrag2021: Resources for a Sustainable Society*, a virtual stakeholder event showcasing some of the Centre’s achievements and impacts since its foundation and highlighting new directions and research areas. The keynote addresses by Dr. Marcia McNutt, President of the U.S. National Academy of Sciences, and Sir Robert Watson, former chair of the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, are available on iCrag’s YouTube channel.

iCrag has been very active in promoting public understanding of the importance of raw materials to society during the year. iCrag and IUGS co-organised the UNESCO Lecture Series on “*Earth Materials for a Sustainable and Thriving Society*” to raise awareness about the role of Earth materials in meeting the UN Sustainable Development Goals. The six-lecture series, which was broadcast live between 26 January and 9 March 2021, included speakers from four continents and attracted more than 4,300 registrants from 145 countries. Recordings can be viewed at <https://bit.ly/UNESCOlectures>.

Another highlight was our partnering with the Natural History Museum (UK) on an exhibit for the (virtual) Royal Society’s “Summer Science Exhibition 2021” event on “*Mining a Sustainable Future*”. A follow-up panel discussion and question and answer session took place in the Green Zone at the COP26 in Glasgow, which was attended by the UK Minister for the Environment, Rebecca Pow.

iCrag’s short film for BBC StoryWorks, “*What do shipwrecks have to do with renewable energy*” was very well received. The film, featuring iCrag researcher Dr. Mark Coughlan, has been viewed over 160,000 times and saw the highest engagement time of all the Science Foundation Ireland films in the series. It also recorded the highest video views across the entire series and was one of the best performing films (by audience view rates) from BBC StoryWorks. You can view the film on the iCrag YouTube channel.

iCrag has engaged in further educational activities through its work with Geological Survey Ireland to create a new continuing professional development course for teachers of leaving

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certificate level geography. The pilot course proved very popular and has resulted in the creation of six top quality educational resources that will soon be made freely available online. iCrag and

Geological Survey Ireland have also continued our partnership with JCT STE(A)M to produce a teacher training workshop with teachers, for teachers. In 2021, over 40 teachers attended the workshop, with 100 signed up to attend to 2022 workshop. Further educational activities iCrag has taken part in include a variety of workshops for Science Week as well as Girls into Geoscience Ireland.

Notable awards include a European Research Council Advanced Grant to Prof. Jennifer McElwain, an IRC postdoctoral fellowship to Dr. Danny Hnatyshin, and GSI short call awards to several researchers. Dr. Aoife Blowick, iCrag Operations Manager, received the Association of Women Geoscientists (AWG) President's Encourage Award for her efforts to encourage women in the geosciences, the Equality, Diversity, and Inclusion in Geoscience (EDIG) group were awarded the "Friend of AWG" Award for 2021, and Dr. Aileen Doran won the SFI Research Image of the Year 2021 award for her image of colloform sphalerite from the Lisheen deposit.

After the challenges of 2021, we hope that everyone can soon return to more normal routines and that 2022 will be a vibrant year for research and outreach activities in iCrag and beyond.

*Maeve Boland and Elspeth Wallace*

*iCrag*

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Irish Group

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Founded in January 1976, the International Association of Hydrogeologists (IAH) (Irish Group) aims to develop and promote the science and engineering of groundwater in Ireland. It has a membership of 139, which includes individuals from professional backgrounds ranging from academic to state agencies to private consultancies. Regular activities include an annual two-day conference, an annual weekend fieldtrip, and a series of monthly lectures and technical meetings. Funding for the association is derived from membership fees and the annual conference. Further details are given below.

### Annual Conference

Due to the Covid-19 pandemic restrictions, it was not possible to hold the 41<sup>st</sup> IAH (Irish Group) Conference in-person. The conference took place over two half-days on the 26<sup>th</sup> and 27<sup>th</sup> April 2021. The theme was “**Catchment Science and Management - The Role of Geoscience and Groundwater**”. The first session was on *Catchments and the Environment*. The theme of the second session was *Investigating and Assessing Catchment Water Quality*. The second day started with a session on *Insights on Water Flow in Catchments*. Session four explored *Managing Drinking Water with a Catchment Based Approach*. There were 335 unique attendees over the two days, with 275 unique viewers on Day one and 250 unique viewers on day two.

### Annual Fieldtrip

The annual fieldtrip took place on the 16<sup>th</sup> and 17<sup>th</sup> October. The theme of the fieldtrip was *Aspects of the Hydrogeology of Northern Ireland*. Fifteen people attended the fieldtrip and the programme included: An introduction to the geology of Northern Ireland (Mark Cooper), The ‘Barbour Well’ and the Northern Ireland Water Lisburn Groundwater abstraction scheme (Conor Lydon), The Garron Plateau, County Antrim (Raymond Flynn and Francis Mackin), Karst Geology and Hydrogeology of Loughareema and Murlough Bay, Northeast County Antrim (Paul Wilson and Mark Cooper), Magilligan Umbra – Conservation management, Hydrogeological Monitoring (Andy Crory, Paul Wilson and Kyle Hunter), Magilligan Test Site, County Derry (Jesus Aguila Fernandez, Mark McDonnell and Ray Flynn), Anney’s Well (sometimes referred to as Blacksprings) (Conor Lydon and Paul Wilson).

### Training Course

A course on **Hydrology for Hydrogeologists** was held on 1<sup>st</sup> and 2<sup>nd</sup> June via Zoom. The course trainers were Paul Johnston (Trinity College Dublin, Dr Judith Stunell (JBA Consulting), Noel Carr (NVM Ltd), Peter Newport & Fergal Kelly (OPW), Conor Quinlan (EPA), Dr Owen Naughton (IT Carlow), Dr Klara Finklele (Met Eireann), Dr Patrick Morrissey (EPA), Dr Shane Regan (NPWS). It was attended by 62 people.

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## IAH Technical Discussion Meetings (TDMs)

All TDMs in 2021 were held online and will continue in this format until further notice.

### 2<sup>nd</sup> February 2021

#### Annual David Burdon Memorial Lecture

*Sustaining water services in refugee camps in Jordan*

Fiona Ward, WASH Specialist with UNICEF

### 2<sup>nd</sup> March 2021

#### IAH TDM

Three talks from Early Careers Hydrogeologists, with a common theme of karst

*The impact of human wastewater effluent contaminants on karst groundwater quality*

Luka Vucinic (iCRAG/TCD)

*E. coli and P. aeruginosa occurrence in private groundwater wells in the Republic of Ireland, with an emphasis on karst"*

Luisa Andrade (iCRAG/UCC)

*Locating flowing conduits in Karst using seismic ground vibrations"*

Haleh Karbala Ali (iCRAG/DIAS)

### 5<sup>th</sup> October 2021

#### IAH TDM

*Assessing Climate Change Impacts to Groundwater: The GSI GWClimate Project*

Ted McCormack and Joan Campanya (GSI/ITCarlow)

*Historical droughts in Ireland: Perspectives from the past to inform the future*

Prof. Conor Murphy (ICARUS/NUIM)

## Outreach

The **IAH website** (<https://www.iah-ireland.org/>) contains relevant publications, conference proceedings and fieldtrip guides.

Three **bursaries** were awarded to postgraduate students to: support the undertaking of an independent research project; purchase consumables and equipment to complete field activities; and to support tuition fees and cost associated with research projects.

The IAH (Irish Group) **YouTube** account (IAH Ireland) currently contains videos of our most recent online events. 12 videos from the 2021 Conference (Catchment Science and Management – The Role of Geoscience and Groundwater) and 8 videos from the 2021 Training course (Hydrology for Hydrogeologists) are available to view online.

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## Department of Geology, IGN report

2<sup>nd</sup> February, 2022

Major changes and ongoing restrictions characterised much of 2021 for the Geology Department at TCD. Prof. David Chew concluded his term as Head of Department in July. Our long-time colleague, Prof. George Sevastopulo, sadly passed away in September. For much of the year up until Autumn many classes were taught remotely and our usual field trips were replaced with local day excursions.

Nonetheless, as elsewhere across Ireland, the tide seems to have turned. The new Earth Surface Research Laboratory (ESRL) has become fully accredited. Mike Stock was awarded an SFI Frontiers for the Future grant (co-funded by GSI) to investigate fundamental magmatic processes which control Platinum Group Element (PGE) mineralisation. This grant will fund two PhD students and one postdoctoral researcher over the next four years. Carlos Rocha received a GRADS & SMARTS (GROundwater Age DistributionS for the Sustainable MANagement of gROundwaTeR reSources in Ireland) award that will provide the first quantitative assessment of average groundwater residence times (GRTs) and mean groundwater travel times (GTTs) in Ireland, to gain insights into the fate and transport of nitrate ( $\text{NO}_3^-$ ) and present the first isoscape (isotopic landscape) of the water cycle in Ireland, from recharge to discharge. This 4-year research project, funded in equal parts by the EPA and the GSI, will also fund 2 full-time PhD studentships.

By early 2022, eight new postgraduate students and postdocs have arrived. These include Foteini Drakou, Maurine Brodbeck and Paul Guyett (as post-doctoral researchers affiliated with iCrag), Vitor Azevedo, Fay Amstutz, Shujing Wang and Didi Wu (as PhD students) and Talha Ucar (as an MSc student). We also welcomed a visiting Fulbright Scholar, Professor David Moecher from the University of Kentucky.

In anticipation of a strong and interesting new year, our traditional field trips to Spain and Greece are scheduled for this spring, and our undergraduate enrolment in Geosciences has increased to 38 students. Most of these students want to do a "Capstone Research Project" where they focus on a defined problem during their fourth year. Combined with plans to return the bottom of the Museum Building to a museum, we look forward to ideas and collaborations with friends and colleagues across Ireland.

Yours sincerely,

**Prof. Gerald (Jerry) Dickens**  
HEAD OF GEOLOGY

## National Museum of Ireland – Natural History

### An Update from the National Museum of Ireland

Staff and contractors of the National Museum of Ireland and Geological Survey Ireland completed the major exhibition Down to Earth – Exploring Ireland’s Geology, which opened in September at Collins Barracks. Using the scientific collections of the Royal Dublin Society, the National Museum of Ireland, and GSI, the exhibition charts the development of geology in Ireland from the 1790s to now. It shows the ongoing work of Irish Earth scientists in addressing natural resources, climate action, and such geohazards as radon gas from bedrock and flooding in karst landscapes. Admission is free; groups must book through [bookings@museum.ie](mailto:bookings@museum.ie); full details are online at <https://www.museum.ie/en-IE/Museums/Decorative-Arts-History/Exhibitions/Down-to-Earth>

Dr Patrick Roycroft was appointed as curator with responsibility for the geological collections of NMI in January 2022. Significant geological acquisitions in 2021 included former UCD teaching collections; staff research collections from UCD; a replica of the tetrapod trackway from Valentia (Kerry); a model specially commissioned for the Down to Earth exhibition of the type of tetrapod that would have made the Valentia trackway.

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## Irish Quaternary Association Update 2021/22

COVID restrictions continued to impact all IQUA activities in 2021. As a result, the Spring meeting, AGM and Autumn Symposium were conducted virtually, and the Autumn Fieldtrip was deferred until Spring 2022.

### Spring Meeting & AGM

The Spring Meeting was held on 16 April via Zoom, organised IQUA PGR Reps Adrienne Foreman and Ryan Smazal. Seven speakers, including four Early Career Researchers, showcased their research on a wide range of themes. The Best Postgraduate Presentation Award was given to Brendan O'Neill (Durham University). At the meeting, Catherine Dalton officially launched *Shaping the Landscape*, an instructional aid focused at Second Level Geography and Earth Science students and future undergraduates. *Shaping the Landscape* is the first Second Level teaching aid for Quaternary Science in Ireland, developed in an iterative process between teachers, geological survey staff (from ROI and NI) and IQUA committee members, with sponsored from the Heritage Council.

The AGM, conducted following the Spring Meeting, was attended by 24 IQUA members. Gayle McGlynn stepped down as an Ordinary Member, having served on the Committee for many years. The Treasurer, Mark Coughlan, reported that IQUA finances were in a healthy position, with income from membership and the INQUA Congress, and decreased expenditure as a result of limited activities because of COVID restrictions. As a result, the Committee had invited suggestions from the membership for initiatives that IQUA could support, which were under consideration by the Committee. Corporate Membership, launched in 2020, was taken by three organisations: Geological Survey of Ireland, ARUP and UCD School of Archaeology.

### Initiatives

In 2021, IQUA launched two new initiatives to encourage and support Early Career Researcher activities.

- Valerie Hall Award for Best ECR Publication in international peer-reviewed media
  - ECR Workshop Support to organise and subsidise training and networking opportunities for early career researchers
-

## **Autumn Symposium**

A virtual symposium was held on 26 November, organised by Gordon Bromley and Gill Plunkett on the theme of “Abrupt Climate Change in the Quaternary”. The programme comprised seven speakers, and the meeting concluded with the announcement of a series of IQUA Awards. The Bill Watts <sup>14</sup>Chrono Award was given to Ryan Smazal (Dundalk Institute of Technology) and Fermin Alvarez (Trinity College Dublin), and the Research Award to Robin Lewando (University College Cork) and Lisa Orme (Maynooth University). The first Valerie Hall Award was won by Cristiana Giglio (University of Ulster) for her paper in *Boreas* entitled “A Late Pleistocene channelized subglacial meltwater system on the Atlantic continental shelf south of Ireland”. Dr Walter Doerfler, University of Kiel, introduced the winner of the Frank Mitchell Award, which was bestowed upon Prof. Michael O’Connell for his long and distinguished service to Irish Quaternary research and teaching.

## **Outlook for 2022**

The easing of COVID restrictions promises to enable in-person events to take place once again in 2022. As a result, IQUA is planning to hold the long-awaited Autumn fieldtrip on 22–24 April, followed by the first IQUA ECR Workshop (28–29 April) and Spring Meeting/AGM (30 April) in Queen’s University Belfast.

The following are the main activities of the society in 2021/ 2022. Further details of all of these activities can be found at [www.imqs.ie](http://www.imqs.ie).

### **Council Meetings**

- Continuous Council meetings were held through 2020, 2021 and 2022.
- AGM's occurred: 16 Feb, 2021; 22 Feb, 2022.

### **Representations in 2019/2020**

Council members represented the IMQS at the following events/committees during 2019 & 2020

- European Federation of Explosives Engineers Conference & committee
- Geo Drilling Apprenticeship meetings
- Quarry Safety Partnership (QSP)
- Minerals Information Working Group (MIWG)
- Department of Environment Communications and Climate Change (DECC) Consultations on Minerals Policy & Geothermal Energy
- Observations to BBC NI on "Spotlight" programme

### **Webinars:**

- 2021Feb16; DECC Geoscience Regulatory update
- 2021Nov09; 'Innovation and Skills'
  - Epiroc
  - DNA Blast
  - Future Cast
- 2022Feb22; Camborne School of Mines Association

### **Annual Review 2021**

The Annual Review 2020 as well as reviews from previous years can be viewed at [www.imqs.ie](http://www.imqs.ie).

### **Annual Dinner Dance 2021**

The Annual Dinner Dance did not take place.

### **Institute of Quarrying – Northern Ireland, Stone Crushers Ball**

The annual Institute of Quarrying (Northern Ireland) Stone Crushers Ball did not take place in 2021.

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### **Annual Field Trip**

The Annual Field Trip did not take place in 2021.

### **Mine Rescue 2020**

Due to the impact of the global pandemic, mutual training is on hold. Mine rescue response across the island of Ireland remains in place.

Air Corps training was held in July 2021 in Tara Mines.

Rescue activities can be found in the 2021 IMQS Annual Review.

### **Geo-Driller Course**

Geoscience Ireland, in collaboration with the Institute of Technology Carlow, is running a Geo Drilling Apprenticeship. The course continues with 6 participants joining in January 2022. Brendan Morris and Sean Finlay are involved in its Steering Committee.

The medal Award for Best Apprentices will take place later in the year when in person events resume.

### **Events in 2022**

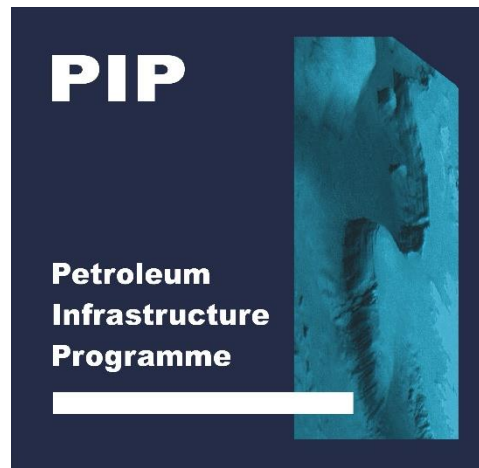
Depending upon restrictions -

1. The Annual dinner is planned for early November 2022.
2. The Annual Field trip is planned for Autumn 2022.

**Nicola Nixon, President of IMQS.**

**17 Feb. 22**

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### **Irish Petroleum Infrastructure Programme – Irish Shelf Petroleum Studies Group:**

Following instructions received from the Department of the Environment, Climate and Communications in June 2021 the Irish Shelf Petroleum Studies Group has terminated its activities. A number of outstanding research projects related to seabird migration patterns; CO<sub>2</sub> storage in Celtic Sea reservoirs; the potential of CO<sub>2</sub> hydrate sealing; and investigation of the Paleocene-Eocene Thermal

Maximum (PETM) global climate change event; will be supported by the ISPSG until they are concluded. Six research projects within the iCrag programme will also be supported but no further research proposals will be invited. These ongoing projects are expected to conclude with final reports by end 2024.



## **Geothermal Association of Ireland. 2021-2022**

### **Report to Irish Geoscience Network February 2022**

#### **Membership & AGM**

- Membership has remained steady at the association throughout 2021 with new memberships from the drilling sector.
- The latest committee meeting was held online on the 15<sup>th</sup> of December 2021. The main activities of the association were discussed the outlook for the work programme for 2022 was discussed.

#### **Website & Social Media**

- The new GAI website was launched in 2021
- LinkedIn and Twitter are the main social media platforms for the association -

#### **Publications**

- A new series of bimonthly newsletters have been launched in 2021 and provide updates on the association's activities, interviews with industry players and project updates

#### **News & Activities**

- In 2021 in partnership with Queens University Belfast, Aberdeen University, and the Geological Survey of Northern Ireland GAI was involved in the delivery of an online 10 webinar series of geothermal energy topics. The talks have provided global perspective on updates from projects, reviews of different technological solutions and policy initiatives. In 2022 this has expanded to cover all of the island with the addition of the Geological Survey Ireland.
- GAI has partnered with [GeoLogica](#) to offer GAI members discounts on courses covering all aspects of geothermal energy technologies.
- GAI is actively involved in Women in Geothermal ([WING](#)) with a GAI committee member also sitting on the WING UK committee.
- GAI is actively participating in the Geothermal Advisory Group set up by the Geological Survey of Northern Ireland and Department for Economy. The work is focussed on developing a roadmap for the development of geothermal energy resources in Northern Ireland through consultation with government, public, academia and industry stakeholders.
- GAI has renewed membership to Renewable Energy Ireland ([www.renewableenergyireland.ie](http://www.renewableenergyireland.ie)) and has helped develop scenarios around potential geothermal deployment in REI's [Renewable Heat Vision by 2030](#).
- GAI is also a member of EGEN (European Geothermal Energy Council).



## Girls into Geoscience – Ireland 2021

*Girls into Geoscience – Ireland (GiGie) is an exciting initiative to introduce female-identifying school and university students to the Earth Sciences and demonstrate the world of careers open to geoscience graduates. The Irish chapter of Girls into Geoscience (GiG) was started in 2018 and is run by a rotating organising committee of inspirational women and allies in the geosciences, overseen by iCRAG, the Science Foundation Ireland Centre for Applied Geosciences (iCRAG) Education and Public Engagement team.*

Following the success of last year's collaborative online GiG event, GiGie came back together with GiG England, GiG Scotland, GiG Wales, and our new sister organisation GiG North to present a two-day online event in June 2021. The event was timed to benefit Irish students that were about to hand in their Change Of Mind CAO forms. This year's online event was hugely successful. The event stretched across two days to allow adequate time for delegates to attend virtual field trips and take part in talks, panel discussions, networking sessions and workshops. GiGie led a Forensic Geoscience Murder Mystery workshop based around locations and samples from the island of Ireland. The workshop was hugely popular with the event attendees, and we were asked to repeat the workshop for the Rediscovery Centre's Science Week programming in November. We are also delighted that experts from Irish Geoscience joined in as expert panellists, speakers and collaborated on the GiGie workshop.

GiGie has launched a new strand to its programming in 2021. We now offer free online or in person (where possible and safe to do so) career talks for any school across the island of Ireland. Any teacher, guidance counsellor or student can go to the [careers talks section of our website](#) where they will find a short bio of an interdisciplinary range of geoscientists from across Ireland. They can then choose one (or more) speaker that they'd like to attend their school and contact us to arrange a talk at a time and date that suits both parties. After the programme's launch in December, we were overwhelmed with requests and currently give a career talk approximately once a fortnight. We are always looking for new speakers to join our cohort, if you are interested, please don't hesitate to get in touch.

After the launch of our new webpage, the GiGie blog has proven popular. We try to post once a month, though for some dates we post more frequently. Our most popular blog post this year was part of a series around World Health Day. This post tackled type one diabetes and life as a geologist, particularly life in the field where an insulin fridge is not an option.

Moving forward, GiGie is working on the development of a further new strand to its programming. We are aiming to develop a programme for Transition Year students that challenges them to explore an aspect of geoscience that is important to them. We hope that this programme will allow us to conduct deeper engagement.

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**ucc**

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University College Cork, Ireland

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## **Discipline of Geology in the School of Biological, Earth and Environmental Sciences, UCC**

2021, despite the challenges of Covid 19, was a busy year for the Discipline of Geology in the School of Biological, Earth and Environmental Sciences at UCC. Dr. Pat Meere continued in his role as Head of Geology. There were no new staff changes during the year. Professor Andrew Wheeler stepped down as Head of School in September and commenced a 6-month research sabbatical leave in December.

Numbers in undergraduate geoscience programmes at UCC are holding up despite the national/international drop in students perusing geoscience degrees. There are currently over 50 full time students registered in the BSc Geology and BSc Earth Science programmes. Emer McKenna won a 2021 GSI Cunningham Award for her undergraduate research project on the geology of Carlingford Igneous Complex. The MSc in Applied Environmental Geoscience continues to grow in popularity with 14 students graduating in the 2020/2021 academic year and 22 students registered for the 2021-2022 year. This programme is very much tied into local and national industry practitioners, the Geological Survey of Ireland and the Environmental Protection Agency all of whom provide direct contributions to curriculum design and delivery.

Geology staff have received a number of awards over the last year. Professor Maria McNamara started a highly prestigious ERC Consolidator grant in July as well as securing funding under the SFI Frontier's for the Future and Discover programmes. Dr Kate Kiseeva acted as an Early Career programme Leader for Goldschmidt 2021. She also delivered a keynote at EMPG-XVII Potsdam in March. Drs Richard Unitt and Pat Meere secured joint TII and iCrag II funding to continue ongoing research of the geological and engineering characteristics of road aggregates. Professor Andy Wheeler secured Petroleum Infrastructure Funding to carry out offshore **bedrock** target analysis for ROV rockdrill sampling, develop a bedrock certainty map and reappraise local-regional scale offshore geology of Ireland.

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The Irish Geological Association (IGA) is open to all who are interested in the geology of Ireland and beyond. Our members range from absolute beginners to professional geologists. We hold lectures and workshops each year and we organise excursions to geologically diverse locations all over Ireland. There is also an almost-annual excursion abroad too. Other events include Members' nights and our AGM. The IGA awards student prizes at the annual Irish Geological Research Meeting. We are involved with the BT Young Scientist Exhibition, G. V. du Noyer Photographic Competition, Heritage Week and Science Week events.

### **2021-2022 Events**

The Irish Geological Association wishes to thank all of our leaders, speakers, workshop teachers, participants, members and sustaining members for such excellent support!

Despite challenges with Covid restrictions, we still managed to put together a pretty packed programme in 2021! We even managed to run a few day excursions when restriction allowed. We kept number of attendees on these low and all attendees were sent recommended covid-19 restriction guidelines and asked to agree to stick to these.

Our Zoom lectures continue to be popular! Our members are well used to these now and it's rare we have technical issues from attendees. Our average attendance for lectures was 43 for 2021. In January we have maintained a tradition of holding a joint lecture with the Cork and Galway Geological Associations. These are extremely well attended and for both this year and last month we hit our limit of 100 people registered for the event! Last month the attendance ended up clocking in at 94.

Date	Event	Attendance
Jan. 20th	CGA/IGA/GGA Lecture by Dr. Chris Standish (Univ. of Southampton) on Gold Providence	-
Feb. 3rd	Lecture by Dr. Robin Edwards (TCD) on Salt Marches and Sea Level Change	46
March 10th	Lecture by Isabel O'Brien (OU) on Geohazards and the Campei Flegrei volcanic field in Italy	31
March 31st	AGM	29
April 14th	Lecture by Jennifer Scully (NASA) on Planetary Geology	57
May 12th	Lecture by Bill Sheppard on Geoheritage and Geological Outreach	66
June 23rd	Lecture by Ed Jarvis (UCC) on Mary Anning	32
Aug. 7th	Excursion Lead by Melinda Lyons (TU Dublin) and Howard Fox (IGA) to Knocksink Wood	13
Aug. 25th	Lecture by Eoin McGrath (GSI) on Green Minerals	56
Sept. 18th	Excursion Lead by Nick Coy to Avoca & Gold panning	24
Sept. 22nd	Lecture by Dr. Shane Tyrrell (NUI Galway)	43
Sept. 25th	Excursion lead by Peter Haughton (UCD) to Hook Pensinsular	15
Oct. 27th	Lecture by Kara English (UCD) on the Central Algeria Basin	33
Nov. 24th	Lecture by Dr. Peter Megaw (President of IMDEX/Cascabel) on Mineral Collecting	25
Dec. 8th	Lecture by Dr. Claire Harnett (UCD) on Volcano Prediction	42
Dec. 12th	Members' Night	9
Jan. 27th	IGA/ GGA/ CGA Joint Lecture by Aileen Boham (GSI/ GEBCO) on Seafloor Mapping	94

## Upcoming 2022 Events

We have a packed schedule this year also. For now, our scheduled lectures will remain to be held via Zoom as they were already scheduled to be so with the speakers. Later this year we hope to offer some live lectures. If there are any offers of venues for these please let us know! We have a full Excursions programme also now that restrictions have fully lifted, with the introduction of weekend-long or a few day-long events.

Date	Event	Speaker/ Leader
Wednesday 23rd February, 7pm	Lecture: Chemical Weathering as a Strategy for the Large Scale Capture and Storage of Atmospheric CO <sub>2</sub>	Prof. Frank McDermot (UCD)
Wednesday 16th of March, 7pm	Lecture: Sliabh Liag	Dr. Sadhbh Baxter (NUIG)
Wednesday 30th March, 7pm	Annual General Meeting & Website launch	N/A
Saturday 2nd April, 10am	Day Excursion: GSI Core Store Visit & Birr Castle	Dr. Markus Pracht (GSI)
Saturday 23rd April, 11am	Earth Day Event: Down to Earth - Exploring Ireland's Geology, Museum Exhibition Visit	Michèle Castiaux & Patrick Roycroft (IGA)
Wednesday 13th April, 7pm	Lecture: Carboniferous basins of the Isle of Man and North Dublin	Dr. Jim Hendry (UCD/ Iapetus Geosciences)
Wednesday 11th May, 7pm	Lecture: Irish Quaternary	Dr Catherine Delany (Manchester Metropolitan University)
May (Date TBC)	Joint Excursion with IAH: Geology (and Hydrology of the Fore Abbey/ Lough Bane Area)	Dr. Robert Meehan (An Talamh)
June (Date TBC)	IGA Members' Night	N/A
Friday 10th June - Sunday 12th June	Weekend Excursion: Geobiology of the Leinster Granite	Maria Cullen and Howard Fox with (NPWS and TCD)
Friday 29th July – Sunday 31st July	Weekend Excursion: Geology of Valentia Island, the Iveragh Peninsula	Gosia Horajska-Shaikh (Kerry Geo) & Dr. Aidan Forde (Valentia Slate)
August	Excursion: Ancient Volcanoes	Margaret Franklin and Maria Cullen
Early September (Date TBC)	Excursion: Quaternary Bus Tour of County Wicklow	Emeritus Prof. Pete Coxon (TCD)
Saturday 24th September	Peter Lewis Memorial Gold Panning Expedition	Dr. Gordon Poole
Autumn 2022	Lecture	Dr. Bill Sheppard
Autumn 2022	Lecture	Prof. Stephen Daly
December (Date TBC)	IGA Members' Night	N/A

Please tune in to our website and social media for more details:

Website: <http://geology.ie/>

Facebook: <https://m.facebook.com/IrishGeoAssoc/>

Instagram: <https://www.instagram.com/irishgeological/>

**Current yearly rates are €30 for a family, €20 for an individual and €5 per student.**

## IGA Council 2021

<p><b>President:</b> Laura Smith</p> <p><b>Outgoing Vice President/ Website:</b> Michele Castiaux</p> <p><b>Treasurer:</b> Emma-Jane Lyne</p> <p><b>Excursions Secretary:</b> Maria Cullen</p> <p><b>Lecture Secretary:</b> Dr. Patrick Roycroft</p> <p><b>Sustaining Membership Secretary:</b> Frank Clissmann</p> <p><b>Health &amp; Safety Officer and Minutes Secretary:</b> Daniel O'Connell</p>	<p><b>Cork Rep.:</b> Dr. Bettie Higgs</p> <p><b>Galway Rep. :</b> Jacinta Hennelly</p> <p><b>Student Rep.:</b> Meabh Banrion</p> <p><b>Newsletter Editor:</b> Margaret Franklin</p> <p><b>OCMs:</b> Tom Mc Goldrick (TBC)</p> <p>Daniel O'Shea</p> <p>Frank Clissman</p> <p>Bill Sheppard</p>
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**Geotechnical  
Society  
of Ireland**

**Recent events**

**13<sup>th</sup> April 2021** (17:00) Geotechnical Society Evening Lecture. “The Gjerdrum Norway quick clay slide of 30<sup>th</sup> December 2020 and Irish peat slides 2020 – some parallels”.

Speaker: Mike Long (UCD)

Venue: Engineers Ireland Webinar on Zoom

**28<sup>th</sup> April 2021** (14:30) Spring Seminar, followed by AGM.

Part 1. “Recent winners of the Young Geotechnical Engineers Award”.

Speakers: Kevin Duffy (TU Delft), Ronan Royston (Ward and Burke Construction), Soroosh Jalilvand (Gavin & Doherty Geosolutions) and Yeganeh Attari (NTNU).

Part 2. “Stillorgan Reservoir – Maintaining stability during decommissioning and for new construction”.

Speakers: Mike Hughes (Atkins) and Mark P. Quinn (Murphy Ireland)

Venue: Engineers Ireland Webinar on Zoom

**Future Events**

**6<sup>th</sup> April 2022** (14:00) 3<sup>rd</sup> Hanrahan Lecture (biennial Honorary Lecture): “How Eurocode 7 has Advanced Geotechnical Design in Ireland and Europe” (Honorary Lecturer: Dr Trevor Orr, Trinity College Dublin) and “Rapid load pile testing and the development of testing standards for non-static pile testing for use within the Eurocode framework” (Dr Michael Brown, University of Dundee).

Venue: Engineers Ireland, Clyde Road, Dublin 4. This has been postponed from 2020.

**19<sup>th</sup> October 2022** Geotechnical Society Conference: “Geotechnical Engineering for Renewable Energy”. Call for abstracts open until 28<sup>th</sup> February 2022.

Venue: The Midlands Park Hotel, Portlaoise

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## National Museums Northern Ireland (Ulster Museum)

### Staffing

The geological work of National Museums NI continues with just a single full-time geology curator, Dr Mike Simms, and two partially retired zoology curators. A new Senior Curator of Natural Sciences, Dr Helen James (an entomologist) was appointed at the end of 2021 and it is anticipated that progress will now be made towards appointing further natural science curators in 2022. Subject areas are not specified, so one of the successful candidates may be a geologist!

A new Natural Sciences Education Officer, Nigel Cook (a zoologist), was appointed in 2021. Based at the Ulster Museum, his role does cover some aspects of geology (dinosaurs and meteorites).

Many of the museum's usual activities and events have continued to be curtailed by Covid restrictions. There were few opportunities for face-to-face events but the museum continued to receive enquiries from the public pertaining to aspects of geology and there was continuing demand for online presentations from audiences across Ireland and beyond, with the geology curator delivering 15 geology-related presentations online. This enables the museum to engage with audiences far beyond its previous geographic range.

### Specimen acquisition

Numerous specimens were acquired through the year, either through field collection or purchase, and have been added to the collections. Notable among these are samples of a garnet-idocrase skarn from Donegal, a piece of aegirine granite from the island of Rockall, substantial (100g+) cut pieces of meteorites from the Moon and Mars, and a meteorite from Algeria (Erg Chech 002) that represents the oldest andesite in the Solar System.

### Publications

National Museums NI's geologist, Mike Simms, was closely involved in a number of publications pertaining to Ireland's geological heritage:

A thematic issue on 'the Irish Jurassic' was published in volume 132 (part 6, pages 625-783) of the *Proceedings of the Geologists' Association* late in 2021. This arose initially from a collaboration between geologists at Geological Survey NI, University of Birmingham and National Museums NI. It featured 11 papers by various authors, and was dedicated to the memory of Tony Hallam, a key figure in Jurassic research through the second half of the 20<sup>th</sup> Century. A plethora of new data were published, among them descriptions of new field sites and two carbon-isotope curves across the Triassic-Jurassic boundary. Many specimens figured and/or cited in these papers are from the collections of National Museums NI, including Ireland's only dinosaur bones and two new species of early Jurassic ammonite.

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A reinterpretation of the emplacement environment of the first tholeiite flow at the Giant's Causeway was published late in 2021, in volume 132 (part 5, pages 537-548) of the *Proceedings of the Geologists' Association*. Field observations demonstrate that the columnar-jointed tholeiites occupy a subsidence hollow in the underlying olivine basalts rather than a river valley as had been proposed by Sergei Tomkieff in 1940. We are working with the National Trust to bring this discovery to a wider audience and to revise elements of the displays, and formal tours, at this geologically important site.

A special issue of *Geology Today* (volume 37, part 6) was devoted to meteorites. Five of the articles were written by National Museums NI's geologist and included images of and reference to a number of Irish meteorite falls, and other specimens in the collections of both National Museums NI and the National Museum of Ireland.

### **Irish Geological Research Meeting**

Late-February 2021 would have seen the Irish Geological Research Meeting return to the Ulster Museum (last held there in 2015). Covid restrictions prevented this from happening and the event was initially postponed until 2022 (now to 2023, as Covid levels here are still high).

**Michael J. Simms**

**Senior Curator of Natural Sciences at National Museums Northern Ireland**



**An Roinn Comhshaoil,  
Aeráide agus Cumarsáide**  
Department of the Environment,  
Climate and Communications

## **Geoscience Policy Division**

### **Department of the Environment, Climate and Communications**

#### **Update on Activities in 2021**

The Geoscience Policy Division (GSPD) of the Department of the Environment, Climate and Communications is responsible for maintaining, developing and promoting policy and legislative frameworks for the mineral, petroleum and geothermal sectors.

2021 is the first year of the Geoscience Policy Division. Throughout the year the focus of the division was on policy development for the mineral, geothermal and petroleum sectors.

#### **Policy Statement on Mineral Exploration and Mining in Ireland.**

On July 2021, GSPD launched a Draft Policy Statement on Mineral Exploration and Mining in Ireland. The aim of this Policy Statement is to establish a clear and sustainable policy framework that supports our communities, our environment, our climate and our mineral exploration and mining sector. Strategic Environmental Assessment and Appropriate Assessment have also been carried out on this Draft Policy Statement

Five key principles and five key priorities are presented in the Draft Policy Statement.

The key principles are robust regulation; increasing awareness and participation; sustainable development; building capacity and access to knowledge; and international co-operation.

The key priorities are building public understanding and trust; enhancing the regulatory framework; research on the role of minerals in the transition to net-zero greenhouse gas emissions by 2050; better data enhancing policy and decision-making; and monitoring, review and reporting.

This Draft Policy Statement also includes the ban on new prospecting licences, mining licenses or leases for coal, lignite and oil shale, in accordance with the Circular Economy Bill 2021.

As part of the public consultation, Geoscience Policy Division organized information sessions in September 2021 and a Town Hall event in October 2021. The Townhall involved a series of guest speakers to present their views on the emerging Policy statement. It also allowed for a Q and A at the end to allow a wider stakeholder group engage with the Department and panelists of the event.

The public consultation ran from July 30<sup>th</sup> 2021 to October 15<sup>th</sup> 2021 and it is expected that the Policy Statement will be finalised in Spring 2022.

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## **Prospectors and Developers Association of Canada (PDAC) Trade Show**

The 2021 PDAC exhibition was held virtually on 08 – 11 March 2021 due to public health guidelines resulting from the covid-19 pandemic. GSPD representing the Government of Ireland exhibited virtually at the event, showing the mineral potential, data availability and the legislative / regulatory regime.

## **Policy Statement on Geothermal Energy for a Circular Economy in Ireland.**

GSPD have also been working on a Draft Policy Statement on Geothermal Energy for a Circular Economy. The Draft Statement delivers on the Roadmap for Geothermal Energy published in November 2020.

Geothermal energy is not only renewable, but also secure, reliable and local. It can be used for heating and cooling buildings and for generating electricity. Advances in technology, proven over the past decade, mean that geothermal energy can now play a significant role in our transition to a carbon neutral and circular economy.

The publication of this Draft Policy Statement supports the first Whole of Government Circular Economy Strategy launched earlier this month and will raise awareness of the exciting potential of this renewable energy. It is an important step in addressing the barriers to the development of geothermal energy in Ireland.

The final Policy Statement will outline the regulatory framework. It will also highlight the requirement for meaningful engagement with the public and for further work in the collection of data on Ireland's geothermal resources. Further research will also be needed for a better understanding of the economics of geothermal energy projects. Together, these elements will help ensure we realise Ireland's geothermal energy potential.

Public consultation on the Draft Policy Statement on Geothermal Energy for a Circular Economy and associated SEA Environmental Report and AA Natura Impact Statement opened on 28 December 2021 and will close on 01 March 2022.

## **ObSERVE Phase 2**

The ObSERVE Programme is a major marine scientific programme that began in 2014, which will help build a greater understanding of Ireland's marine species and the habitats they need to survive and to thrive. The ObSERVE programme helps us to plan marine activities and development, without threatening sensitive marine ecosystems.

The data collected as part of the first phase of the programme has already filled major data gaps and has assisted in more informed and sustainable management of offshore activities, and in the development of suitable conservation strategies that will sustain our marine environment into the future.

The second phase of ObSERVE begin in June 2021 with the start of aerial surveys, which is being undertaken an Irish-led international consortium and will build on the knowledge and data gathered in the successful first phase.

The Programme is jointly funded by the Department of the Environment, Climate and Communications, the Department of Housing, Local Government and Heritage and Sustainable Energy Authority Ireland (SEAI).

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## **Petroleum update – Licensing**

The Programme for Government commitment to end the issuing of new licences for the exploration and extraction of gas, on the same basis as the decision taken in 2019 by the previous Government in relation to oil exploration and extraction, was placed on a statutory footing with the commencement of the Climate Action and Low Carbon Development (Amendment) Act 2021. Holders of existing authorisations are not affected by the changes, and may apply to progress through the standard lifecycle stages towards production, subject to regulatory consents being given. Since 1 January 2021, the Geoscience Regulation Office in the Department of the Environment, Climate and Communications has been responsible for regulation, licensing and enforcement of the Irish petroleum sector.

## **Petroleum Policy Statement 2022**

The Department will also publish a revised policy statement in 2022 which will replace the December 2019 Policy Statement – Petroleum Exploration and Production Activities as part of Ireland's Transition to a Low Carbon Economy.



## **Report from the Irish UNESCO Global Geoparks Committee – 2021**

*The Irish UNESCO Global Geoparks Committee (IUGGC) operates on an all-island basis to allow for networking and exchange of knowledge from all those involved and interested in UNESCO Global Geoparks across the island.*

### **Members:**

Kirstin Lemon (Chair) – Geological Survey of Northern Ireland  
Clare Glanville (Vice-Chair) Geological Survey Ireland  
Grainne O'Connor – Cuilcagh Lakelands UNESCO Global Geopark  
Martina O'Neill – Cuilcagh Lakelands UNESCO Global Geopark  
Carol Gleeson – Burren & Cliffs of Moher UNESCO Global Geopark  
Eamon Doyle – Burren & Cliffs of Moher UNESCO Global Geopark  
Robbie Galvin – Copper Coast UNESCO Global Geopark  
John Galloway – Copper Coast UNESCO Global Geopark  
Sarah Gatley – Copper Coast UNESCO Global Geopark

### **Active UGGp applications:**

- An application was submitted to UNESCO from the Joyce Country and Western Lakes Aspiring UNESCO Global Geopark (UGGp) in November 2021. The area underwent a pre-submission evaluation visit by the IUGGC in October 2021, after which the final application dossier was submitted and verified before sending on to UNESCO via the National Commission in Dublin.
- The Mourne Gullion Strangford Aspiring UNESCO Global Geopark was evaluated in November 2021, postponed from Summer 2020 due to the Covid-19 pandemic. As this area is entirely in NI, the application has to be submitted through the UK National Committee for UNESCO via the UK Committee for UNESCO Global Geoparks. The results of this evaluation will be officially communicated in Spring 2022.

### **UGGp revalidations:**

- Cuilcagh Lakelands UGGp (formerly Marble Arch Caves UGGp) was revalidated in October 2021 (postponed from Summer 2020). The results of this will be officially communicated in Spring 2022.

### **Committee Activities**

- The IUGGC held their first Committee meeting since before the onset of the Covid-19 pandemic on 10 May 2021. Items discussed were the forthcoming COP26 in Glasgow, the 9<sup>th</sup> International Conference on UGGps in Jeju, and participation in the UNESCO Global Geoparks Youth Forum.
  - The Irish UGGps attended a climate change workshop organised by the UK Committee for UGGps in association with the UK National Commission. This workshop aimed to enhance climate literacy and provided the opportunity to catalogue all of the climate change adaptation and mitigation measures being delivered by both existing and aspiring UGGps in Ireland and the UK.
  - The IUGGC organises an annual Irish Geoparks Forum to allow for networking and engagement amongst all those interested in UGGps on the island of Ireland. This virtual event was attended by over 50 people. The theme of the forum was 'Geoparks and Climate Change' and the keynote speaker was Sara Gentilini, the founder of the GeoFOOD project and a member of the management committee of Magma UGGp, Norway.
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The SUI is delighted to be able to continue our involvement with the IGN. For those unfamiliar with our organisation we are the representative body for cavers, the sport of caving and the science of Speleology in Ireland and Northern Ireland.

This year the SUI has continued our work with the CatchmentCARE project, carrying out a major removal of waste from Polnagossan Cave as part of our on-going conservation efforts, generous funding was provided by the EU INTERREG fund, and further conservation work at a number of sites is planned for the upcoming year.

We are pleased to announce that our scientific fund, the Parkes Fund, has been approved and can be made available to those wishing to undertake some form of speleological research. We continue to seek potential funding support streams to further boost the amounts available to researchers through this fund and would welcome the suggestions of other members of the IGN in this regard.



## **Update from the Geoscience Regulation Office**

### **Department of the Environment, Climate and Communications**

#### **Clare Morgan, Head of the Geoscience Regulation Office**

##### **Restructuring**

The Geoscience Regulation Office (GSRO) of the Department of the Environment, Climate and Communications (DECC) was established on 01 January 2021. The GSRO resulted from a restructuring of the geoscience functions within DECC, following a review carried out in late 2019 and early 2020. Two new divisions namely the Geoscience Policy Division and the Geoscience Regulation Office replaced the Exploration and Mining Division (EMD) and Petroleum Affairs Division (PAD).

The new configuration provides for a clear dividing line between the policy and legislative functions and the regulation and monitoring functions in the DECC geoscience area, but retains and builds upon the expert and professional manner in which these functions have been delivered. The re-organisation also separates the promotion function from the regulation office.

##### **Geoscience Regulation Office**

From January 2021, the regulatory and enforcement functions previously held in EMD and PAD transferred to a new dedicated Geoscience Regulation Office. This new Office within DECC is responsible for managing the regulation, licensing, compliance and enforcement roles for mineral and petroleum exploration, production and decommissioning, and in addition future geothermal applications and regulation is to lie within the GSRO remit.

Essentially the GSRO has two components in terms of functionality i.e. (i) Licensing/Certification and (ii) Monitoring/Compliance Assurance for the petroleum, minerals, mines and geothermal sectors.

The GSRO is responsible for regulation in the Irish offshore (oil, gas), nearshore and onshore (minerals, mines, geothermal). Regarding exploration in the minerals sector GSRO administers Prospecting Licences (PLs), including reviews, renewals and applications. On the petroleum exploration side, GSRO handles a variety of licences that include licence progression through licence phase applications, extensions and Lease Undertakings (in line with the current Programme for Government, GSRO is not accepting any applications for new petroleum licences). Every quarter, the Department publishes an Acreage Report and Concession Map of petroleum exploration & production authorisations and quarterly PL competitions that GSRO generates.

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Regarding production, the GSRO handles mining facilities (e.g. Tara and Drummond Mines) and production from the Corrib gas field.

All exploration and production activities related to the sectors (e.g. seismic acquisition, boreholes, site surveys) are handled by the GSRO.

On the compliance side all licences are monitored, including inspections of gas pipelines offshore, mine inspections etc. The GSRO is also responsible for regulation and oversight of the decommissioning of the Kinsale Gas field.

The GSRO is responsible for data management and agreements and is in receipt of all data associated with all licences in the GSRO remit with substantial digitally captured databases. The GSRO has an established tracker system for all authorisations/licences/permits onshore and offshore Ireland. Our database also includes the petroleum database of cores and samples (core store) and GSRO hosts the national archive for petroleum technical data. These databases are immensely valuable and are extensively utilised and sought by researchers. GSRO staff also has representation on national and international bodies in the sectors.

The GSRO of the Department of the Environment, Climate and Communications (DECC) is currently the designated competent authority under EU legislation to implement (a) the Kimberley Process Certification Scheme (KPCS) in respect of imports and exports of rough diamonds to and from Ireland; and (b) the application of the rules (w.e.f. January 2021) to ensure importers of minerals or metals comply with their supply chain due diligence obligations and responsibly source such minerals and metals.

The reputation of the GSRO is aligned with the current DECC Statement of Strategy under *Strategic goal 05: Ensure best in class governance and regulation* – Ireland will have robust, transparent and effective regulatory frameworks in place to support a sustainable society and economy and a well-protected environment. This includes “Effective operation of the newly established Geoscience Regulation Office in licensing, monitoring and enforcement of minerals, mining, petroleum and geothermal sectors.”

During the year 2021 the GSRO issued a new publication entitled "Seismic Data Acquisition, Reporting & Submission: Mineral Exploration Guidance Document" available at [gov.ie - Guidelines for Mineral Exploration](http://gov.ie - Guidelines for Mineral Exploration) and <http://www.mineralsireland.ie/> that will be of interest to members. Another new item published in 2021 by the GSRO is an addendum to the 1994 Terms and Procedures for Prospecting Licences. This addendum revises the aggregation and carry-over terms and procedures and can also be found at [gov.ie - Guidelines for Mineral Exploration](http://gov.ie - Guidelines for Mineral Exploration).

The GSRO looks forward to engaging with the IGI, the IGN and all our stakeholders under the new configuration.

I attach two Figures that show the 2021 year end distribution of petroleum (December 2021) and mineral prospecting/mining licences (November 2021) offshore and onshore Ireland.

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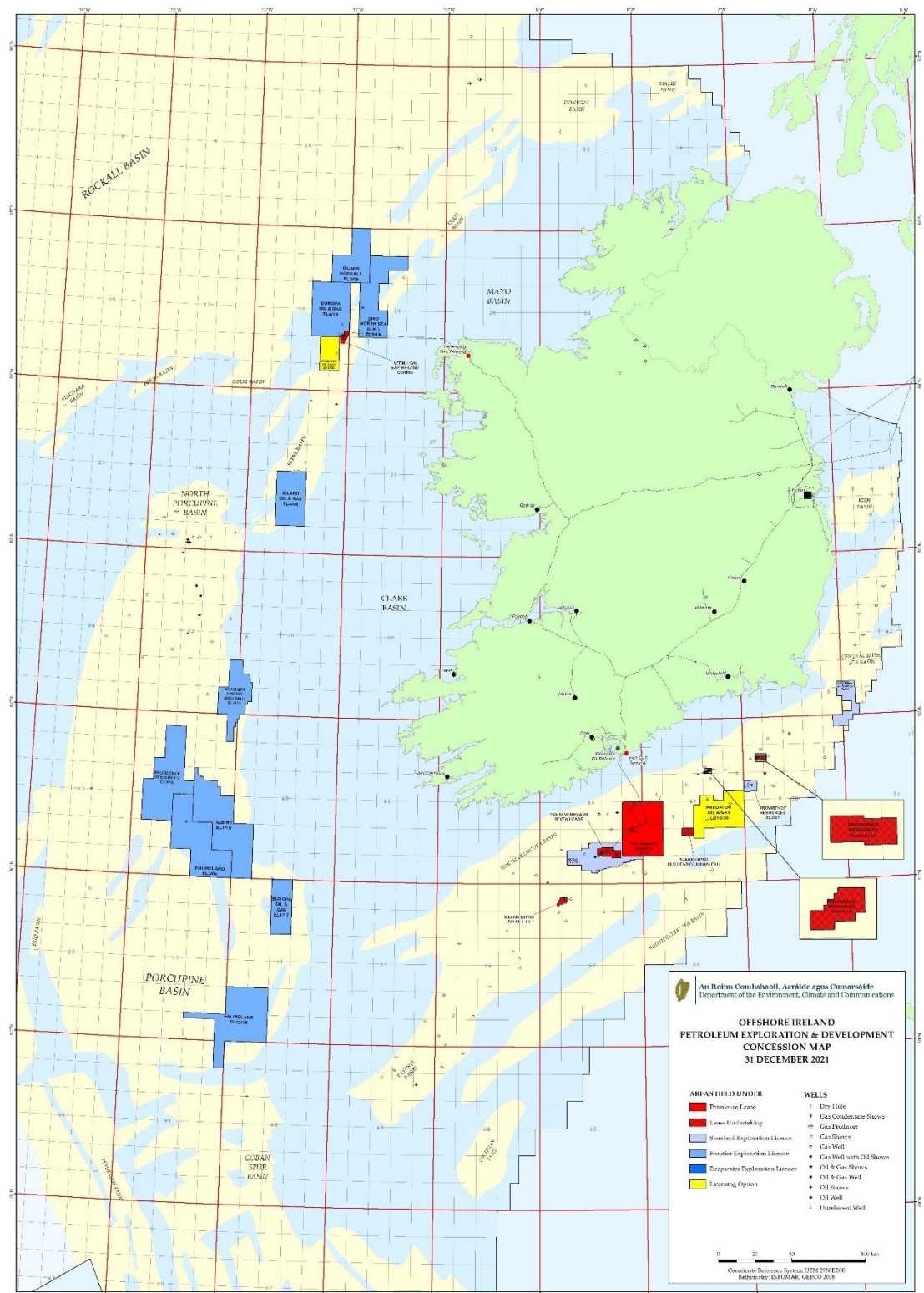


Fig. 1 Petroleum Concession Map December 2021

Prepared by the Geoscience Regulation Office  
Department of the Environment, Climate and Communications

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**Fig. 2 Mining and Mineral prospecting area Map November 2021**



Department for the  
**Economy**  
[www.economy-ni.gov.uk](http://www.economy-ni.gov.uk)

**GSNI** Geological  
Survey of  
Northern  
Ireland  
[www.bgs.ac.uk/gsni](http://www.bgs.ac.uk/gsni)

The Geological Survey of Northern Ireland (GSNI) is an office of the Department for the Economy (DfE) in Northern Ireland staffed by scientists of the British Geological Survey (BGS) based in Dundonald House, Belfast.

GSNI 's datasets are available on Open Data NI and Spatial NI. GSNI also hosts data and information on geology, engineering geology, minerals, borehole data and site records, mines, quarries and pits, airborne geophysics, soil and water geochemistry on GeoIndex.

The GSNI office is based at Dundonald House on the Stormont Estate Belfast where it runs an enquiry service and shop; it also manages a national core store and sample repository at Duncrue Industrial Estate.

GSNI actively engages and works with all parts of society including central and local government, industry, academia, community organisations, NGOs, schools and the general public. GSNI staff collaborate on applied geoscience research with BGS, the Geological Survey Ireland and over 35 universities globally.

You can view the GSNI latest Annual Report 2020 – 2021 on the following website:

[https://www2.bgs.ac.uk/gsni/GSNI\\_AR\\_2020-2021.pdf](https://www2.bgs.ac.uk/gsni/GSNI_AR_2020-2021.pdf)

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## **OUGS Ireland AGM 22<sup>nd</sup> January 2022**

### **Branch Organiser's Report**

Thank you to all our branch members for remaining with us during this time of the Covid virus.

This year we were able to hold one field trip in September to Co. Meath, led by Robbie Meehan. He took us to Archaeological sights to study the building stones used. This was a very interesting and informing trip. The number of members attending this group gathering were in line with the rules of the Republic of Ireland. (Robbie must have also organized the sunshine for us as we were very lucky with the weather that day)

I have been sending e-mails to all our branch members regularly with any information. I have also been including in my e-mails Quiz questions which have been much appreciated.

However, we really need a Newsletter Editor for our Ireland Branch. You will receive lots of help.

Thank you for attending our Zoom AGM Branch Meeting and best wishes to everyone.

Phyllis Turkington.  
OUGS Branch Organiser

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An Roinn Comhshaoil,  
Aeráide agus Cumarsáide  
Department of the Environment,  
Climate and Communications



**Geological Survey**  
Suirbhéireacht Gheolaíochta  
Ireland | Éireann

## **Irish Geoscience Network: Geological Survey Ireland, 2021 update and 2022 Plans**

The Geological Survey is Ireland's Geoscience agency and is part of the Department of the Environment, Climate and Communications (DECC). Geological Survey Ireland's role is to provide reliable and independent geological data, information and advice to a wide variety of customers/stakeholders, and provide policy advice, planning tools and project partnership, particularly in relation to Irish geoscience input into other Government Departments, Agencies, local authorities and EU Programmes, as well as developing Irish geoscience research capacity and increasing jobs in the geoscience sector.

2021 was another challenging year for Geological Survey Ireland operations due to COVID-19 restrictions on fieldwork; however the bulk of our intended programme was completed. Additional challenges resulted as we moved buildings from Beggars Bush, which is undergoing refurbishment.

Geological Survey Ireland's office address is now; Geological Survey Ireland, Department of Environment, Climate & Communications,

Block One, Booterstown Hall, Booterstown Avenue, Booterstown, Co Dublin, A94N2R6

Our Operations Centre, including labs, customer centre, equipment, national geological archives and storage are based at a new facility; Geological Survey Ireland, Unit 4036, Kingswood Avenue, City West, Co. Dublin, D24 VY00

### **Programme updates.**

#### **Tellus Project.**

2021 marked the tenth anniversary of the Tellus Programme. Unfortunately COVID-19 meant we were unable to mark this event in person. However, despite the on-going uncertainty with the pandemic and most of us still working from home, the Tellus survey plane and field samplers did manage in 2021 to leave their homes and collect new data. The airborne geophysics survey completed two separate blocks this year finishing the A8 block covering part of counties Laois, Kilkenny, Carlow and Tipperary and completing coverage over the Rathdowney Trend. A second survey block was also flown over County Cork resulting in approximately 80% of the country now surveyed. The geochemistry team were again busy in 2021 undertaken an urban soil sampling programme in Dublin which culminated in a visit to Áras an Uachtaráin to sample the grounds and to have tea with the president. The soil samplers then continued the regional soil survey visiting nearly 2000 sites in the southeast. Recently the Tellus and minerals sections have released one of the largest geochemical datasets containing over 350,000 data points from the Mineral Prospectivity Project being carried out in northwest Ireland. 2022 will see the surveys continue as we move towards national coverage and the continuation of research projects and the development of new products and outputs.

#### **Marine and Coastal Unit.**

INFOMAR, the national marine mapping programme, completed the sixth year of its Phase II programme, which will see all Irish waters mapped by 2026. In 2021 total marine mapping achieved was 7949 sq.km (gross coverage from both Geological Survey Ireland and Marine Institute combined).

Nearshore and inner shelf mapping was undertaken by Geological Survey Ireland utilising five survey vessels and focused on the Celtic Sea off west Cork, outer Galway Bay and islands and the Irish Sea east of Dublin. Offshore mapping was undertaken by the MI vessels in the Celtic Sea further south again,

using both the Celtic Voyager and Celtic Explorer. Shipwrecks continue to be investigated and recorded as part of INFOMAR mapping, working in conjunction with National Monuments Underwater Archaeology Unit (DHLGH). Mapping and sediment sampling was also carried out by Geological Survey Ireland in Wales as part of the CHERISH project, along with oceanographic surveying over shipwrecks of archaeological significance on the SW coast. It is planned in 2022 to extend inshore survey coverage along the coasts of Kerry, Clare and Galway, along with offshore areas on the inner Atlantic and outer Celtic Sea shelves.

#### **Groundwater and Geothermal Unit.**

GW3D Phase II (2019 – 2022, extended by one year): *Catchment based Groundwater Resource Assessment – Leinster Region*: 32 catchment assessments reports to be published in March 2022. These will more comprehensively support the supply of clean drinking water (guidance for better resources) and WFD management (understanding the catchments). Fieldwork to verify desk studies planned for 2022 (delayed from the planned 2021 schedule due to DECC procurement and finance governance issues). Geological Survey Ireland will finalise its participation in the CatchmentCARE InterReg North-South project this year, which included drilling of a number of monitoring boreholes in key vulnerable catchments. Geological Survey Ireland will also be participating in the Lough Carra LIFE project (5 year project). Geological Survey Ireland's role will be to improving the conceptual understanding of the lake and its catchment to aid nutrient management, water quality and maintenance of ecological status. Geological Survey Ireland will be inputting into the transposition of the EU Recast Drinking Water Directive into Irish legislation.

Geothermal Energy: After last year's publication of an *Assessment of Geothermal Resources for District Heating in Ireland* in conjunction with a Roadmap for a Policy and Regulatory Framework for Geothermal Energy in Ireland, work was focussed on gaining additional deep geological information. A geothermal test hole of just over 1km was completed at TUD campus Grangegorman in Dublin and recorded a bottom hole temperature of 36 degrees Centigrade.

#### **Geological Mapping (Quaternary & Bedrock Geological Mapping).**

Bedrock geological mapping, in follow-up to Tellus surveying, was carried out in Wexford, with publication of a 1:50k map and data package due in 2022. Deep (1.03km) borehole drilling was aimed at further resolving the Carboniferous stratigraphy of the northwest midlands. The geological logging of a deep geothermal borehole at Grangegorman included stratigraphic and fracture logging, in support of geothermal interpretation of the borehole. A **Coastal structures and sediments (COASTS)** map compilation was produced as a digital map package covering a 1km radius inland from the coast to support internal and external stakeholders with an interest in coastal developments and change. Quaternary mapping in Wexford focussed on coastal geology to contribute to erosion/protection work, with an expanded area to be targeted in 2022. A Field Guide to South Mayo, authored by Dr John Graham, including a new 1:50k map, is printed and due for launch in early 2022. In 2022 we will also support the Just Transition Project providing compiled geological bedrock and Quaternary data for the relevant area and develop, in conjunction with INFOMAR, an onshore – offshore digital compilation map data package for NW Galway Bay in support of proposed ORE developments in the area.

#### **Geological Heritage.**

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Leitrim County and Galway City Geological Heritage audits were published in 2021 and audits of Limerick and Cork County (phase 1 of 3) were completed. The Limerick audit will be published in 2022. We continue to support the geologists in the 3 UNESCO Global Geoparks. Joyce Country & Western Lakes project started in January 2020 and submitted their application to UNESCO in November 2021, now establishing the project as an Aspiring UNESCO Global Geopark. Seven Geoheritage grants were awarded to diverse community-led projects around the country. In 2022 it is planned to complete the Geological Heritage audits of Cork County (phase 2 of 3) and Cork City. The programme is also working closely with Wicklow and Longford County Heritage Officers to publish 'Popular' geoheritage books for the general public. The books are based on the Geological Heritage audits completed for both counties and were commenced originally by Matthew Parkes and his co-authors of the respective audits.

### **Minerals.**

The Minerals programme is continuing its extensive collaborations with European partners across a wide range of raw materials projects. Development is continuing on a new quarry database and technical expertise will be provided to the Dept. of Housing and the relevant market surveillance authorities, particularly focused on deleterious materials in construction products. Within the Irish mineral exploration space, the Minerals programme is continuing to collaborate with multiple industry and academic partners to improve the data availability for exploration, including an improved National Borehole Database, data collation for underexplored areas and Mineral Prospectivity Mapping in collaboration with the Tellus programme in the north-west midlands.

**The Sandyford corestore continues to operate as the National Geological Corestore with a regional branch now established in Birr, Co. Offaly. The hyperspectral scanner is scheduled to receive an upgrade in 2022, including the acquisition of a medium wave hyperspectral camera to complement the existing high resolution RGB and short wave IR. A significant quantity of core from industry sources has been accepted into the national collection and will be catalogued and made available for stakeholder access.**

### **Information Management.**

Geological Survey Ireland is continuing to develop the National Geoscience Data Centre (NGDC). Progress was delayed due to constraints of building moves and network reconfigurations in 2021.

**Communications:** Public and stakeholder events were changed, curtailed or postponed in 2021 due to the COVID-19 pandemic. **The BT Young Scientist and Technology Exhibition moved online on January but we continued to have a virtual presence and continued to sponsor a special award. TV show – the 2021 episode of 10 Things To Know About..... by Geological Survey Ireland was on geohazards as related to coastal change and featured the work of the CHERISH Project and the coastal mapping by Geological Mapping and the Marine and Coastal Unit. It was broadcast in late November. We also contributed to various other programmes including Eco Eye on RTÉ, An Cuan an TG4, and Great Coastal Railway Journeys on BBC (Michael Portillo). Production is now complete on the 3-part tv series on the geology of Ireland due to be broadcast in late spring on RTÉ and BBC NI. This show is financed by Geological Survey Ireland/DECC, BAI and the two broadcasters and will be a showcase of Ireland and its geology.**

**Down to Earth – Exploring Ireland Geology: The exhibition at the National Museum of Ireland, Collins Barracks was opened by Minister Eamon Ryan on 27 September 2021. Curated by Siobhán Power from Geological Survey Ireland and Matthew Parkes and Nigel Monaghan from the National Museum, it is a celebration of Ireland's geology, the work of Geological Survey Ireland and the use of Earth's resources in our daily lives. It is getting great reviews from the public and it expected to run until late**

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**2023. A geologist is available Wednesdays – Fridays every week and a programme of educational events is planned for 2022/2023. During 2021,**

**Geological Survey Ireland released a suite of briefing notes on current topics including geothermal energy, soil, geological research in Ireland and radon. We will continue this in 2022.**

**Education:** We worked with iCrag to develop and deliver a workshop for JCT STEAM on sustainable energy sources. It was our first online workshop and was well received by those in attendance. The 2022 workshop will be on Geothermal energy for Ireland. We also worked with iCrag and volunteer teachers on developing Leaving Cert Geography resources. All resources will be available on the website.

### **Research.**

The Geological Survey Ireland Research Programme represents and supports Irish geoscience research activities at a national level. In 2021, it awarded eight new small Equipment Grants across a range of topics. A further two projects in the area of energy were funded (co-funded with the SEAI) and two projects co-funded with EPA in the areas of critical raw materials for Ireland and aging of groundwater. Geological Survey Ireland and the EPA also funded a project under the new Fast Track for Policy programme to assess the existing knowledge of soils in Ireland and possible gaps that need to be filled to support policy and regulation. Similarly to support the work of the Department of Housing, Local Government and Heritage, Geological Survey Ireland and DHLGH are co-funding a project measuring pyrite reactivity in construction materials. Two large-scale projects were also awarded under the SFI Frontiers for the Future Programme and co-funded by Geological Survey Ireland – these aim to assess and predict sea level changes for Ireland and assess platinum group mineralisation in Ireland. 2021 also saw the first research projects using the new facilities at the Earth Surface Research Laboratory in TCD. 2022 saw the first live-streamed Researchers' Night with a panel of Geological Survey Ireland staff discussing the role of geoscientists in assessing and managing our groundwater, minerals, and geothermal energy. Geological Survey Ireland and the Economic and Social Research Institute completed research on public understanding of mining in Ireland and the public perception of risk. We also initiated work on the Geological Survey Ireland strategy and contributed to the new national research strategy and a national research classification scheme for research in Ireland. Information on all research projects funded by Geological Survey Ireland is available on [www.gsi.ie](http://www.gsi.ie)

**National Committees:** Geological Survey Ireland participates in or supports a wide range of national fora including several related to Water Policy (DHGLH), Office of Emergency Planning (tsunami, ash and flooding) hosted by Dept of Defence, National Landscape Strategy, RIA Geographic and Geosciences Committee, Irish UNESCO Global Geoparks, Open Data Gov, Marine Co-ordination Group, National Standards Authority of Ireland (NSAI) and Dublin Institute of Advanced Studies board. Geological Survey Ireland continued to participate in the DHGLH interdepartmental Committee on National Coastal Change strategy, supporting both the Steering Group and Technical sub-Committee. In addition, staff members participate in committees of very many of the Geoscience organisations and research bodies such as iCrag, many of which also receive support of funding or corporate membership from Geological Survey.

**International:** Geological Survey Ireland is active in a number of international Programmes and Networks. Principal among these is EuroGeoSurveys (EGS), the representative body of Geological Surveys, who have an office and secretariat in Brussels, with several Survey staff members engaged in expert groups and projects. Project participation includes EPOS (European Plate Observing System), EMODNET (European Marine Data and Observation Network), ERAMIN2 (Minerals Research), and numerous EU raw materials/minerals projects. GeoERA the EGS's network supporting research in the areas of GeoEnergy, Groundwater, Minerals and the Information Platform, completed its initial development phase at end 2021. EGS is also building the European Geoscience Data Infrastructure or EGDI which will provide access to Pan-European and national geological datasets and services from the

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Geological Survey Organisations of Europe. Geological Survey Ireland also participates in the Integrated Ocean Drilling Programme (IODP) supporting both the European Management (ECORD) and technical (ESSAC) committees, and North Atlantic Geoscience group (NAG).

**Geoscience Ireland:** 2021 was a landmark year for this successful business cluster programme developed by Geological Survey Ireland in response to the economic crisis to help create and maintain jobs in geoscience. The programme is now transitioning to a new model, where it will be funded by a mixture of members fees and grant aid and will no longer operate as a programme of Geological Survey Ireland (see separate report).

**Staffing:** At year end there was 100 staff, 46 of whom are permanent, including 36 technical/professional staff positions.

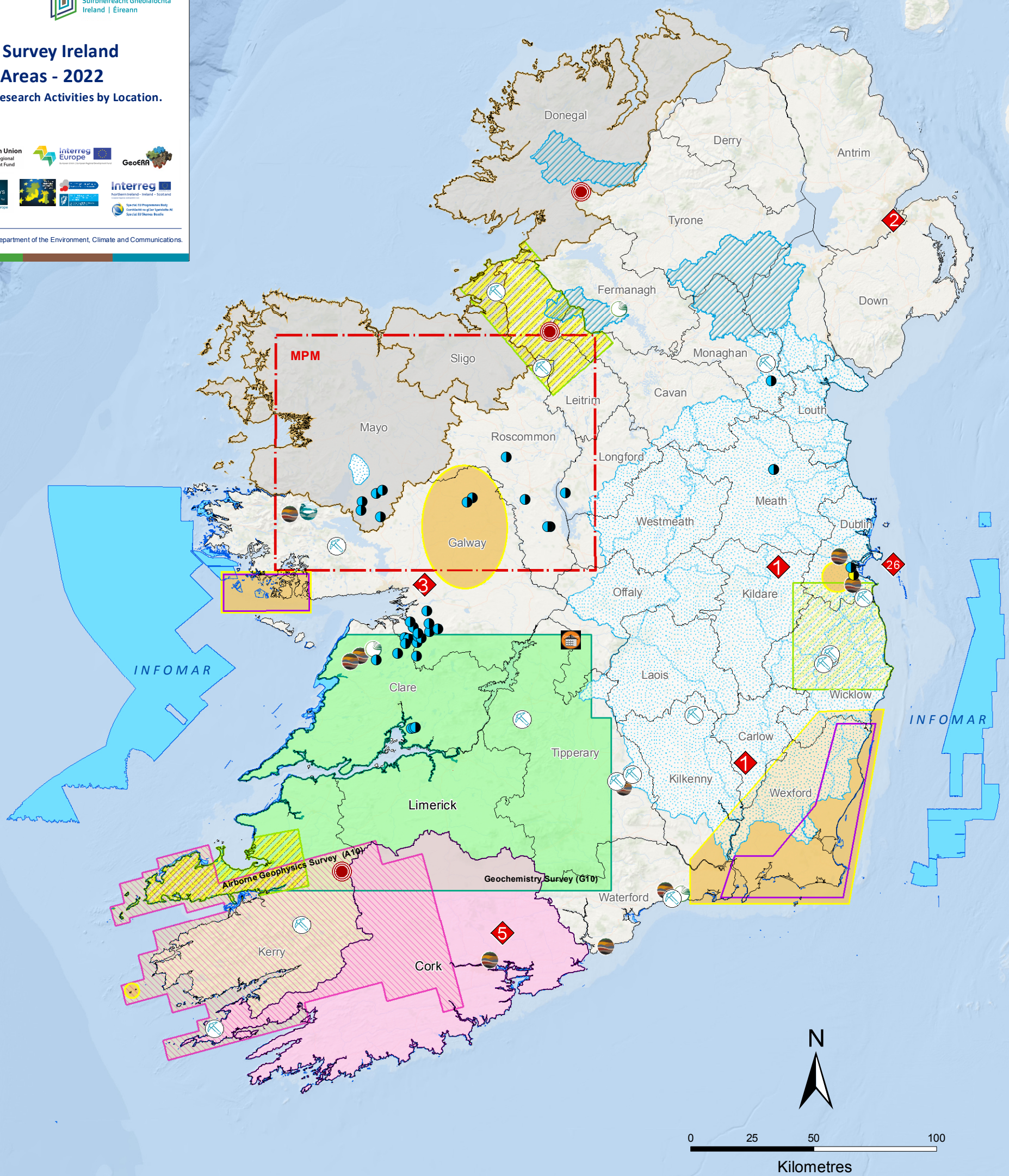
**2022 (For field operations see draft activity map below)**

## Geological Survey Ireland Activity Areas - 2022

Survey, Support and Research Activities by Location.



Geological Survey Ireland is a division of the Department of the Environment, Climate and Communications.



### Key to Activity Classifications

Groundwater & Geothermal	GW Mapping (Geothermal/ GW 3D Study Area Catchments)/ Lough Carra LIFE Project	CatchmentCARE (INTERREG)	Groundwater Monitoring Sites	Groundwater Geothermal Research Boreholes
Geological Mapping	Bedrock Mapping	Quaternary Mapping & Geotechnical Data Entry	Landslide project with NPWS	
Geoheritage	Geoheritage County Audit (Cork & Cork City)	UNESCO Global Geoparks	Joyce Country & Western Lakes Aspiring Geopark	Geoheritage Projects
Minerals	Minerals Quarry Database (Meath, Mayo & Donegal)	MPM	Historic Mine Sites (Mintell4EU)	
Research Projects	39 Number of Geological Survey Ireland funded research projects			
Tellus	Airborne Geophysical Survey (A10)	Geochemistry Survey (G10)	Geological Survey Ireland Corestore - Birr, Co. Offaly	
Marine & Coastal Unit	INFOMAR Survey Area			

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# DIAS

Institiúid Ard-Léinn | Dublin Institute for  
Bhaile Átha Cliath | Advanced Studies

The DIAS Geophysics section had an eventful year in 2021. Our researchers have continued to remotely attend conferences such as EGU, EAGE, ORFEUS, ICEG and AGU and have continued to present posters, talks and seminars throughout the year. It was also a busy year with four PhD students successfully defended their PhD vivas. Dr Florian La Pape was awarded the SFI-IRC Pathway Program.

DIAS hosts national data networks, infrastructure and equipment pools such as the INSN, the iMARL equipment pool and a large mobile seismic and magneto-telluric terrestrial instrument pool. In 2021, major components of these networks were upgraded and expanded and there are plans to continue this work into the future. Dr Duygu Kiyani was awarded in Dec 2021 the SFI infrastructure Program co-funded by GSI, and was granted €857,475 to purchase state of the art magneto-telluric equipment to enhance the current pool.

International collaborations with other research institutions, universities, project partners and collaborators were essential to continuing research throughout the COVID-19 pandemic. We have relied on and contributed to the international scientific network to continue producing world class research. Current large scale collaborative projects include iCrag2, IMPROVE, DIG, DEEP, SPIN, IGUANA, ESA 3D Earth, POROCLIM and HEKLA, as well as ongoing individual level interdisciplinary work with our research partners around the world.

In particular, we collaborated on a number of large scale marine projects using the iMARL equipment pool this year. DIAS collaborated and was part of the team that organised the marine project UPFLOW led by University College London (UCL). The project is led by PI Ana Ferreira and funded by the European Research Council (ERC) and will deploy fifty OBSs in the North Atlantic Ocean. Seven of iMARL OBSs were deployed in the Azores-Madeira-Canary Islands region in July 2021 and will be recovered in September 2022. Samaneh Baranbooei, a PhD student in DIAS, was on board for the deployments. DIAS also collaborated on marine research with Dr Mark Coughlan and Andrew Trafford. Two of DIAS's NAMMU OBSs were deployed in the Irish Sea on board the Celtic Voyager from the 16th - 22nd March. These deployments occurred alongside a development of a fibre-optic approach for offshore site investigation undertaken by UCD.

It was a busy year with publications too, with many published in major journals such as Geophysical Journal International, Nature Communications, Science advances, Earth and Planetary Science Letters, International Journal of Disaster Risk Reduction, Seismological Society of America, Geophysical Research Letters, Precambrian Research, Geophysical Prospecting, Nature Geoscience, Studia Geophysica et Geodaetica and Journal of Volcanology and Geothermal Research

Outreach events this year included Culture Night Talks, Samhain agus Science and various art science collaborations such as the STUDIOPIA project with artist Siobhan McDonald and “Sounds of the Earth” with music artist David Stalling. Researchers from the section also conducted a number of radio interviews and commentaries on geophysical events of public interest, such as a blog on EGU Seismology Division titled: “A unique opportunity: volcanologists chase a spectacular volcanic eruption in Iceland” by Patrick Smith, Nima Nooshiri and Ka Lok Li and an Irish Times Article on 'The origin of seismic 'Love waves'. Dr. Haleh Karbala Ali took part in the PORO-CLIM expedition aboard the RV Celtic Explorer as part of their outreach program.