51st HERDMAN SYMPOSIUM
ENERGY AND SUSTAINABILITY

Saturday, 17 February 2024

Time:

Registration from 9:30

10:00 - 17:00

Drinks reception 17:00 - 18:00

Location:

Central Teaching Hub,

University of Liverpool,

L69 7BX

Contents

The Herdman Society would like to give a massive thank you to all our sponsors, the University of Liverpool School of Environmental Sciences, and Earth Science Research Group (ESRG) for their support and donations to help run this event.

Schedule

09:30 **Welcome and registration**

10:00 **<u>Introduction</u>**
Presentation by Jack Lynch (Herdman Society President).
Introductions from Dr Janine Kavanagh (Reader in Volcanology, University of Liverpool),
Jennifer Davies and Liam Rooney (Herdman Symposium Secretaries).

10:10 **Dr David McNamara - University of Liverpool**
'Mineral processes impacting geological solutions for Net Zero'

11:00 **Dr Frances Cooper - University College London**
'Tectonics, climate, and copper in the Central Andes'

11:50 **Break**

12:10 **Dr Joshua Griffiths - National Nuclear Laboratory**
'Nuclear waste management and disposal in the UK'

13:00 **Lunch**

14:00 **Dr Jessica Pugsley - University of Aberdeen**
'Virtual outcrops in the modern geological toolkit'

14:50 **Dr Jeremy Sloan - University of Warwick**
'Perovskites in geology and material science: from igneous rocks to the picoscale'

15:40 **Break**

16:00 **Dr Kathyrn Moore - Camborne School of Mines, University of Exeter**
'Geoenergy, critical metals and responsible mining'

16:50 **Final remarks**

17:00 **Drinks reception**

Mineral processes impacting geological solutions for Net Zero

Dr. David McNamara - Senior Lecturer Earth, Ocean and Ecological Sciences, and Deputy Director of SEM-SRF, University of Liverpool

Background

I am a geologist with a focus on understanding how fluid flows through the Earth's crust and how that impacts processes from natural resource generation, operation, and sustainability, to the occurrence of geological hazards. I specialise in the application of structural geology, geomechanics, and mineralogy to assist in the development of geothermal, mining, and carbon storage systems, as well as understand the interlinked role between structure, stress, fluid, and earthquake behaviour. I obtained my undergraduate degree in geology from Trinity College Dublin and a PhD in microstructural geology from the University of Liverpool. Post-PhD I worked as a researcher and consultant with GNS Science in New Zealand for the Natural Resources Division, specialising in geothermal reservoir characterisation. Since 2016 I have been working as a university academic first as the Head of the Geofluids Research Group at the National University of Ireland Galway, and now in my current role at the University of Liverpool. My research focuses on understanding both the positive and negative impacts of mineralogical processes within Net Zero geological systems, as well as exploring how faults and fractures do or do not channel fluid flow in geothermal and CO2 sequestration systems.

Speakers

Abstract

Society looks toward several geological solutions in our efforts to reach a Net Zero reality, from geothermal power and heating to capturing CO2 in mineral form, to increasing our utilisation of energy-critical materials for green technology development. As a result, there is an increased need for a better geological understanding of these potential Net Zero systems. A crucial geological aspect of these systems is the mineralogical processes that occur within them, some of which are beneficial to the goals of that Net Zero system, some of which are inhibitive. For example, many geothermal reservoirs rely on an open, connected fracture network to sustain geothermal fluid flow. Mineralisation in these fractures, leading to vein formation, works over time to close these pathways up reducing the efficiency and output of a geothermal resource over time. On the other hand, mineral-forming processes resulting from injecting CO2 into certain rock types result in CO2 becoming permanently captured in mineral form, e.g. carbonate minerals, removing it from the atmosphere. Similarly, critical materials such as rare earth element minerals, or critical element minerals (e.g. lithium, cobalt, molybdenum), also form via mineralisation processes within the subsurface. Despite the known occurrence and importance of these mineral processes in such important geological systems, there remain many unanswered questions about how these minerals nucleate and grow over time, how fast they grow, and what conditions either enhance or inhibit this growth. By examining examples of mineralised Net Zero systems with advanced microanalytical techniques we can begin to identify these mineral nucleation and growth mechanisms, gain new insight into rates of mineral development, and characterise the conditions under which they occur. It is hoped that with such new information to hand, geologists can aid in the development of techniques that either encourage or discourage these mineral processes from happening, helping make our Net Zero geological resources more sustainable and efficient.

Speakers

Tectonics, climate, and copper in the Central Andes

Dr. Frances Cooper - Associate Professor in Earth Sciences, University College London

Background

Frances Cooper is an Associate Professor in Earth Sciences at University College London, which brings her back full circle to where she started as an undergraduate in 1999.
She completed her PhD at the University of Southern California, USA in 2008 and then worked as a postdoctoral researcher at Arizona State University for four years.
She was finally lured back to Blighty for a lectureship at the University of Bristol in 2012, where she stayed for 11 years before her recent return to UCL.
Frances' research takes a multidisciplinary approach to understanding the mechanics of large-scale continental deformation, the evolution of orogenic systems, and the role of tectonics and climate in ore formation.
Her work has taken her around the globe from studying active faulting in the Gulf of Corinth, Greece, to constraining the exhumation of mid-crustal rocks in Nevada, USA, to investigating the role of crustal extension in the eastern Himalayan Kingdom of Bhutan. In recent years, she has worked closely with the mining industry to understand how tectonics, magmatism, volcanism, and landscape evolution combine to control the formation, enrichment, and preservation of porphyry copper deposits, particularly in northern Chile and the southwest USA.

Abstract

Copper is a vital part of global efforts to transition away from fossil fuels towards a greener, low-carbon economy. It is an essential component of most clean energy technologies, from wind turbines and solar panels to electric vehicles and energy storage. Most of the copper we use today is mined from porphyry copper deposits (PCDs), which are magmatic-hydrothermal systems primarily formed within subduction zones. However, PCDs contain extremely low concentrations of copper (typically $\lesssim$1% Cu), meaning that huge quantities of rock must be removed to retrieve a tiny amount of copper. As the demand for copper grows, so too does the need to minimise the environmental impact of its extraction. This means seeking out the most copper-rich ("highest-grade") deposits, which generate the least amount of waste.

High-grade copper deposits tend to result from interaction with oxygenated groundwater, which leaches and reprecipitates the copper in a more concentrated form. This implies the need for a wet climate, but some of the largest and highest-grade PCDs are found in the Atacama Desert on the western side of the Central Andes in northern Chile, which been dry for at least 16 million years. It has been suggested that the onset of aridity in the region was caused by uplift of the Andes, which blocked moisture travelling from the east. However, others have suggested that the arid climate could have been established much earlier, long before Andean uplift. In my talk, I will explore the relationship between Andean uplift, aridity, and copper enrichment in northern Chile, which is important for understanding the interplay between tectonic and climatic processes and has direct implications for copper exploration.

Nuclear waste management and disposal in the UK

Dr. Joshua Griffiths - Disposal Core Science Theme Lead (Geoscientist), National Nuclear Laboratory

Background

Current work

- NNL Disposal Core Science Theme lead
- NNL Discipline Technical Lead for geoscience, engineered barrier systems, and subsurface engineering related to radioactive waste management and disposal
- Honorary Research Associate at the University of Liverpool

Previous work

- Geoscientist, BP (Africa New Ventures, West Africa Exploration, and North Sea Renewal)
- Postdoctoral Research Associate, University of Liverpool

Education

- PhD in Environmental Sciences, University of Liverpool
- MESci Geology and Physical Geography, University of Liverpool

Abstract

As a pioneer of nuclear technology, the UK has been producing and managing radioactive waste on an industrial scale since the 1940s. Released in January 2024, the UK's Civil Nuclear Roadmap to 2050 sets out the pathway to a UK resurgence in civil nuclear with an ambition for up to 24 Gigawatts (GW) of nuclear capacity by 2050 (sufficient to cover up to a quarter of the country's projected electricity demand). The UK has also joined 20 nations, including the US, France, Ghana and the UAE, in endorsing the net zero nuclear declaration, calling for a global tripling of nuclear energy by 2050.

At present, the UK's radioactive waste is stored on an interim basis with more waste expected to be produced from new nuclear power stations, decommissioning programmes, and the clean-up of existing facilities for decades to come. There is international consensus that the safest solution for high & intermediate level waste is for it to be emplaced in a Geological Disposal Facility, deep underground and permanently isolated from people and the environment for hundreds of thousands of years. This talk will introduce nuclear energy and provide an overview of past- current- and future UK and international radioactive waste management and disposal programmes, and provide an opportunity for discussion and questions.

Speakers

Virtual outcrops in the modern geological toolkit

Dr. Jess Pugsley - Research Fellow,
University of Aberdeen

Background

Jess is currently a Research Fellow in Virtual Geoscience and the Energy Transition at the University of Aberdeen. Since moving to Aberdeen in 2012 Jess has completed a Bsc and PhD in Geology. Since 2017 she has been employed by the University as a Teaching Assistant and is currently on her 3rd year as a Research Fellow.
Her research integrates virtual and physical field work in a range of geological settings, as well as the development of virtual field trips in teaching.
Jess completed her PhD in 2021where she studied the Palaeogene volcanic and intra-volcanic sedimentary successions on the Isle of Mull, Scotland, using extensive fieldwork, virtual outcrops, petrology, and igneous geochemistry.

Abstract

The advent of photorealistic, 3D computer models of geological outcrops (virtual outcrops) represents an significant development in the geoscience. Today, most virtual outcrops are generated through photogrammetry, a method of building 3D models from hundreds of overlapping photographs. Drones provide the best method of photo collection as they can acquire photos from multiple angles and get full coverage of the outcrops. As drones are now relatively low cost and easy to fly, they have become an essential part of the geologist's field kit. More recently many new smartphones have integrated close-range LiDAR enabling the construction of very high resolution mini virtual outcrop models. Traditional fieldwork can be greatly supplemented by virtual outcrops, particularly in mapping and measuring inaccessible cliff sections. Virtual outcrops can also be a key component of virtual field trips (VFTs). VFTs provide a virtual experience that can be used to enhance or even sometimes replace physical fieldtrips, for example by integrating world-class example outcrops from across the globe or comparing geological outcrops to modern analogues (e.g. modern river systems).

VFTs provide opportunities to widen the access to the geosciences and bring the outcrop to the student when the student is unable to get to the outcrop. In this seminar we will undertake a mini virtual geological field trip around the world visiting a number of virtual outcrops, as well as a brief overview of virtual outcrop collection and processing methods.

Perovskites in Geology and Materials Science: from Igneous Rocks to the Picoscale

Dr. Jeremy Sloan - Reader in Electron Microscopy, Department of Physics & Warwick Centre for Analytical Science, University of Warwick Coventry

Background

Jeremy completed his PhD in Materials in 1995 in the School of Engineering at the University of Wales, Cardiff under Prof. Richard J. D. Tilley FRSC. He then joined the Inorganic Chemistry Laboratory at the University of Oxford in 1995 as a PDRA, initially working with Prof. Malcolm L. H. Green FRS, and during this time discovered 2 x 2 and 3 x 3 atomic layer KI "Feynman Crystals" (aka 'Extreme Nanowires') and 1D polyhedral chains of lanthanide, barium, cobalt and other halides grown in single walled nanotubes. In 2000 he was awarded a Royal Society University Research Fellowship and in 2004 I received the FEI European Microscopy Award at the ICEM in Antwerp. After a Senior Lectureship at the University of Surrey and a Readership at QMUL, Jeremy moved to the University of Warwick where he is now Reader in Electron Microscopy. Subsequently in 2018 he was awarded an EPSRC Established Career Fellowship to further research the crystallography and functional evolution of atomically thin confined nanowires formed in carbon nanotubes.

Abstract

The perovskite structure, with its almost infinitely adaptable array of derivatives, must count as one of the most important in materials science with the essential ABX_3 (A = a large cation; B = a smaller cation; X = an anion) structural archetype contributing to ferroelectric, piezoelectric, superconducting, photochemical, and many other technologically important properties. The Perovskite structure of course has geological origins and was discovered in 1839 by the Prussian mineralogist Gustav Rose in mineral deposits in the Ural Mountains who named the structure for the Russian mineralogist Count Lev Aleksevich von Petroski. This name has been extended to a family of compounds collectively referred to as the perovskites in order to accommodate the vast proliferation of derivatives many of which deviate from the ABX_3 archetype (e.g. Ruddlesden Popper $A_{x+1}B_xO_{3x+1}$ and Roth $A_xB_xO_{3x+2}$ phases). The immense diversity of perovskite functional properties did not just develop from the interests of materials scientists as many of the defining characteristics are also present in the original minerals. For example, naturally occuring $CaTiO_3$ and $BaTiO_3$ both exhibit non-centrosymmetric distortions causing them to have orthorhombic rather than the expected cubic crystal structures. These deviations from 'ideal' symmetry, paired with the immense compositional variety possible at the A and B sites have given rise to so many of the important physical characteristics mentioned above and below.
Global Interest in perovskites is rapidly accelerated by developments in the fabrication of hybrid or all-inorganic halide perovskite ABX_3 structures where A is an organic or alkali metal counterion, B typically lead or tin, and X any one of the halogens, allowing materials with optical and photovoltaic characteristics, exploitable in solar cells, supercapacitors, and other energy storage devices to be developed. These structures also have geological counterparts among fluoroperovskites, for example elpasolite (i.e. K_2NiAlF_6), thomsenolite ($NaCaAlF_6.H_2O$), weberite (Na_2MgAlF_7) and cryolithionite ($Na_3Li_3Al_2F_{12}$) among many others.
In common with synthetic oxide perovskites, halide perovskites are typically manufactured in gram to milligram quantities whereas naturally occurring perovskites on Earth's surface typically form μm^3 to cm^3-scale crystals that can be observed in an optical microscope or a magnifying glass. This belies the fact that silicate perovskites predominate in the Earth's mantle with Bridgmanite (or silicate-perovskite) forming an astonishing 38% of the Earth's volume. At the other end of the scale, how small can we go ? Modern applications of perovskites often require them to be made on a quantum scale with colloidal, 2D, quantum dot, and, in thin films, molecular-scale preparations being developed, fine tuning optical band gaps and other properties. In Warwick and, in complementary research in Berkeley in the US, we have made unit-cell and sub-unit cell halide perovskites by growing them inside carbon nanotubes. This has enabled the growth of single-unit (and sub-unit cell) cell wide $CsPbX_3$ (X = Br, I) and $CsSnI_3$. Even on this small scale, these materials reproduce many of the same structural characteristics that we commonly associate with the bulk materials but also with some eye-catching differences. In my presentation, I will attempt to put all of these aspects into context, never losing sight of the fact that, without the contribution of the geological sciences, none of this would have been possible.

Speakers

Geoenergy, critical metals and responsible mining

Dr. Kathryn Moore - Senior Lecturer in Critical and Green Technology Metals, Camborne School of Mines, University of Exeter

Background

Kate Moore is a geologist and specialist in Critical and Green Technology Metals at the Camborne School of Mines, University of Exeter (UK).
Her 30 years of interdisciplinary research experience include: metal ore-forming geological systems; the scales of mining and diffusion of innovation to improve security of supply of metals; technical and societal innovations towards sustainable futures; and knowledge-sharing in the circular economy.
She was a finalist for a European Commission (Futurium) Innovation Radar Prize for Women-led Innovation in 2019 and a Royal Cornwall Polytechnic Society medallist for excellence in science in 2023.

Abstract

The low carbon transition is a minerals-energy nexus, in which progress towards Net Zero Goals is challenged the total materials requirements for infrastructural change and associated energy demands. The pattern of energy transitions from coal, to oil and gas, to nuclear energy, to renewable energy is one of increasing access to geological resources, where the fabric of modern society demands an escalation in mining operations. High, sustained and increasing economic stress to provide raw materials results in permanent and globally-unequal socio-environmental strain. The point of failure of modern consumer society occurs where the wider-reaching socio-environmental strains exceed the demand for extractive operations. The implication is that geoscientists have a significant role to play in articulating the true value of, and increasing dependence of society on, the mineral resources of the Earth, and the risk that it constitutes.

Geoscientists are tasked with accounting the resources that can already be accessed, in creating new ways to understand ore deposits better, to explore deeper or in more extreme environments, and to find ore deposits that suit economic paradigms for low unit cost production. The knowledge we create needs to support a nuanced dialogue about the kind of resource that will be available, quantified in ways that inform more than profit margin or risk management (ESG criteria) calculations, and how we can articulate technical and socio-environmental challenges. The work of geoscientists is scrutinised by multiple stakeholders, including academics, policy-makers, industrial practitioners, the media and publics. Policy-makers are responsive to issues of critical risks of supply shortages for raw materials (e.g. critical metals), due to the potential for disruption to manufacturing and consumption-based economies. Strategic approaches to addressing intersectional raw materials challenges include (1) closing of the renewable energy & mining loop, (2) increasing recycling, though this alleviates little of the stress to increase mining, (3) trade agreements to secure access to international supplies, (4) building capacity in local and/or regional raw materials production for resilience in the face of disruption to international sources. Case studies will be presented to demonstrate how the ontologies of geology are changing in response to the low carbon transition.

Liverpool Geological Society

The Liverpool Geological Society (LGS) has been a consistent sponsor of the Herdman Symposium for many years, for which we, as a society, are very grateful.

The LGS was formed in 1859. Our Past President and Member, Professor Herdman and his wife endowed a Chair of Geology in The University of Liverpool in 1916 in memory of their son Lieutenant George Herdman who was killed in the First World War. With the opening of a Department of Geology in 1929, again due to Professor Herdman's generosity in memory of his wife, Jane, many LGS meetings were held in that building at the invitation of Professor PGH Boswell, the first Professor of Geology at The University of Liverpool.

After more than 160 years, meetings continue to be held in The University of Liverpool, although are now held in the Central Teaching Hub. The Society still flourishes and offers a varied programme of illustrated talks, occasional practical sessions, and field excursions.

Lecture meetings and practical sessions are held on selected Tuesday evenings from October to April. Guest speakers include local experts and internationally recognised scientists. Field excursions, usually on selected weekends during March to September, include nearby day trips as well as residential visits to more distant parts of the UK or overseas. Visitors and new members are welcome at all meetings.

For more information about the society and its activities follow the link to its website:

https://www.liverpoolgeologicalsociety.org/

The Geologists' Association

Since its formation in 1858, the GA has actively promoted the study of geology to all who are interested in the past, present and future of the natural world. It is a friendly and inclusive organisation and welcomes everyone, regardless of the level of their knowledge.

In August 1858, a letter appeared in the magazine The Geologist proposing the formation of 'an Association of Amateur Geologists' so that 'solitary' students of the science could form a society where they 'could compare notes, give an account of our rambles, examine one another's fossils and minerals and … be of great assistance to one another.' As a result, an initial meeting by interested parties was held in London on 29 November 1858, to discuss the establishment of such a society. The name 'The Geologists' Association' was formally adopted at a meeting of the organising committee on 17 December 1858, and a 'Prospectus' was circulated with The Geologist of January 1859. The first Ordinary Meeting, held on 11 January 1859, was attended by some 200 persons and the first Annual General Meeting took place on 2 January 1860. In the formation of the Association, particular emphasis was placed on the holding of 'Excursions or Field Meetings.' These, together with a regular programme of lectures and an annual exhibition, have remained the 'backbone of the Association' since. Another early objective of the Association was the formation of Local Groups, in order to advance the interests of the Association, initially in the home counties, both for the benefits of members and to liaise with other 'Field-clubs and Societies.' With the passage of time, our Local groups have since spread across the country.

Unlike the Geological Society of London (established in 1807 to cater for the needs of professional geologists), where women were not admitted to membership until 1919, 'Ladies' were eligible for membership of the Association from its formation in 1858. In the same spirit, there has never been an age limit on members of the Association (in 1862, a boy of 7 years of age was made a Life Member of the Association by his father), and there have been many subsequent instances of teenagers among our membership. Today, the needs of the youngest members of the Association are catered for by our junior club, Rockwatch, (sponsored by Anglo American, Statoil and the Geological Society) established in 1992; again, field excursions play a large part in its activities. For more information about the society and its activities follow the link to its website:
https://www.geologistsassociation.org.uk/

Geoscience Energy Society of Great Britain (GESGB)

The GESGB (previously called PESGB) was established in 1964 by a group of like-minded professionals keen to create a community of geoscientists for networking and sharing ideas. Over 50 years on, we have maintained those founding principles.

With a membership of around 3000 individuals, active in six continents, the GESGB community is supported by various Regional Branches and Special Interest Groups. We have established a number of flagship events where professionals network, share technical excellence, and discuss the latest developments. These events include PETEX, BEOS, Asia Pacific and a vast array of field trips, courses, seminars and conferences.

We have donated over £2m over the years supporting various educational projects including; school-based education, university support and public engagement, with the aim of raising the profile and impact of geoscience. We also established a public annual lecture programme designed to promote geology and earth science which has featured speakers including Lord Robert Winston, Sir Tony Robinson, Hugh Dennis, Dallas Campbell and Professor Iain Stewart. In 2017, Professor Kenneth Lacovara headlined our national GEOLiteracy Tour where he delivered his engaging talk 'Why Dinosaurs Matter', which engaged over 1,500 people outside the society.

As we work to promote our industry, GESGB has created partnerships with other professional societies and organisations to share knowledge and support the aspirations of our members.
For more information about the society and its activities follow the link to its website:
https://www.ges-gb.org.uk/

GESGB

GEOSCIENCE ENERGY SOCIETY OF GREAT BRITAIN

Are you in search of a community where your passion finds companionship among like-minded individuals?

We are a Society dedicated to individuals engaged in or studying the subsurface energy industries.

Led by Society members, we serve our industry by providing, networking and knowledge-sharing events, conferences, and workshops.

Join the GESGB Society today and unlock a world of exclusive benefits! Enjoy unbeatable discounts on conferences, publications, and society events.

BECOME A GESGB MEMBER TODAY!

To learn more about member benefits, visit our website HERE.

GESGB MEMBERSHIP

Prices from **£25***

Get a free Night School Recording of your choice (worth £70!) when you sign up!

Geotechnics

GEOTECHNICS

BUILD ON CONFIDENCE

Geotechnics…. it's been in the name since 1983. We deal with the engineering and environmental interaction between earth materials and the built environment delivering first class site investigation services to like- minded clients; providing high quality data to reduce uncertainty in the ground and aid clients with geotechnical and geoenvironmental soil and monitoring parameters for foundation design, slope stability assessment, earthworks, dewatering, remediation and overall design works.

Our Company values (Quality, People, Integrity), ethos and vision is everything to us. Our vision is simple - to be the very best at what we do and to ensure the experience of working with and for us is enjoyable for you and our clients.

We aim to nurture and provide a workplace where everyone is involved, passionate and driven to deliver the very best quality site investigation services and data to serve the construction industry, wider community and the environment in which we operate and live.

With 4 offices and projects across the UK we are always looking for Geology, Geo-environmental analysis, Engineering Geology, Civil Engineering or similar graduates with drive, curiosity and integrity to join our Graduate Engineer Training Scheme.

A two-year tailored programme that aims to apply and build upon your skills learnt at university and arm you with the necessary new skills, knowledge and experiences to make you the very best engineer you can be in the ground engineering industry. Along the way you will be looked after, trained, mentored and coached by some of the best in the industry to progress further along the Engineer route and on to Chartership.

To find out more check out our dedicated graduate page at https://www.geotechnics.co.uk/graduates

Student Engineer (Chester)

About the Company

Geotechnics…. it's been in the name since 1983. We deal with the engineering and environmental interaction between earth materials and the built environment. We work with soil, rock, groundwater and other man made materials to help ground truth and understand the site-specific engineering behaviour beneath our feet. We offer value through our research, investigation, testing, monitoring, reporting and evaluation to reduce the risks associated with the unknowns at pre-construction stage.

Our Company values (Quality, People, Integrity), ethos and vision are everything to us. Nurturing and providing a workplace where everyone is involved, passionate and driven to deliver the very best quality site investigation services and data to serve the construction industry, wider community and the environment in which we operate and live.

Our vision is simple - to be the very best at what we do and to ensure the experience of working with and for us is enjoyable for one and all.

It's an exciting time for Geotechnics as we look to grow and build upon our solid foundations established some 40 years ago whilst striving to remain as committed, motivated, determined and responsive to our people as we are to our clients.

At Geotechnics we take great pride in being people focussed with integrity – our people are our most important and greatest asset and without we couldn't do all the great work we do.

We value everyone's thoughts, talents and ideas. We're excited to see what you can make happen and we look forward to working with you.

What you'll do:

As a Student Engineer your role will be to assist both out Engineers and Technicians as you gain experience of all aspects of site investigation. You will work as part of a team and experience the initial learning phase of our Graduate Engineer Training scheme. Particular emphasis will be placed on learning core skills such as the logging of soil and rock, managing site investigations, compiling reports and the processing of in situ test data. You will also be given an introduction in to the importance of Health and Safety and you will use this important experience and knowledge to spend time on-site assisting our engineers and technicians carrying out site investigations. You will also have a chance to experience working in our of UKAS accredited laboratory based in Coventry where you will be introduced to a range of tests on both soil and rock to the appropriate British Standard.

What we're looking for:

We are currently looking to recruit individuals who are studying Geology and are:

- Enthusiastic and keen to learn.
- Able to work as part of a team.
- Able to communicate effectively.
- Able to accurately record details and maintain good records.
- Hold a full UK driving licence (essential).

All applications are to be sent to recruitment@geotechnics.co.uk by 31st March 2024.

Soilsafe

Redeveloping contaminated land has a multitude of stakeholders, a wide range of implications and is filled with acronyms, jargon and technical ambiguity... SoilSafe focuses on helping you decipher this complex world and keep your development safe from delays, unwanted abnormal costs and potential prosecution.

With hazardous landfill tax at £94.15 per ton, and set to rise, the cost of removing a single wagon load of hazardous soils to landfill is around £3000.

SoilSafe has recognised that the majority of site investigations do not properly consider the waste classification of soils, which is typically the most expensive ground based abnormal cost.
Why settle for inadequate hazardous soil classifications? SoilSafe will use a range of techniques to correctly classify soils as non hazardous, with total costs waste soil airisngs being as much as 90% cheaper!

The moment you excavate Made Ground soil on your site, it is defined as waste by both the Environment Agency and HMRC...

... it should therefore attract landfill tax at nearly £200 per m^3!

SoilSafe can ensure that your soils are reused sustainably and legally to keep you safe from excessive taxation, damaging negative publicity and costly litigation.
For more information about the company and its activities follow the link to its website:
https://www.soilsafe.co.uk/

SoilSafe are using Novel Geophysics to help achieve Net Zero in the Construction Sector

Introduction

SoilSafe provides specialist support to contractors carrying out land remediation, earthworks and ground improvement. In June 2021 the company then expanded by delivering the ACSW (Advanced Continuous Surface Wave) ground stiffness testing system which allows low carbon ground strength testing to allow engineers to use **less concrete, less steel and produce less waste during foundation construction.**

SoilSafe is now the sole provider of ACSW testing in the world.

Methodology

Advanced Continuous Surface Wave testing uses seizmic wave velocity measurements to determine ground strength in **minutes!**

Application

In variable ground, foundations can now be confidently tailored to the ground, rather than resorting to traditional, high carbon "hard engineering" solutions, such as piled foundations

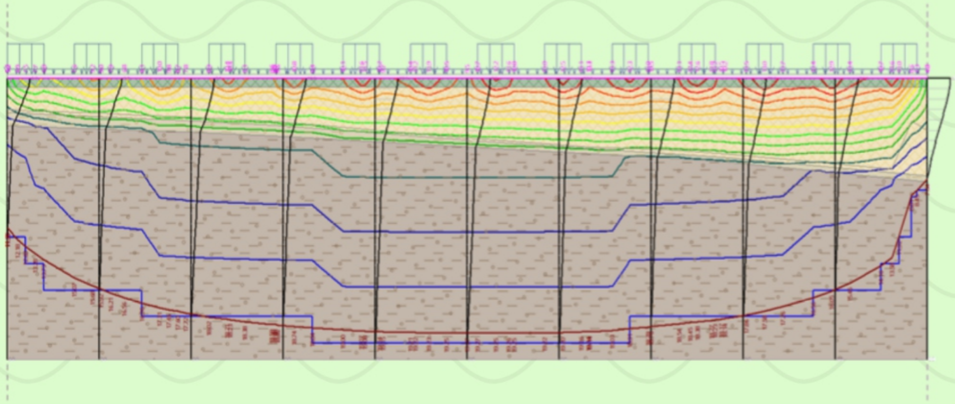
Results

Reduction in Concrete Use

Reduction in Steel Use

Reduction in soil going to landfill

Reduction in Plant / Haulage fuel



Conclusion

By using the ACSW technology to quickly, cheaply and accurately measure the properties of the ground we want to develop, we can provide safer designs, avoid over engineered infrastructure, reduce concrete and aggregate consumption, reduce plant and haulage emissions and do our bit in heading towards construction Net Zero.

Photo credits
Front cover:
Top image - Grand Prismatic Spring in Yellowstone National Park Author: Veronika Bykovich
Bottom left image - Valley in Andes Mountains under Blue Sky Author: Esther Perez
Bottom right image - Perovskite $CaTiO_3$ Author: © Elmar Lackner 2020
Back cover - Quadrangle, University of Liverpool Author: Brit in Seoul