

# Conference Agenda

## Session Overview

Date: Saturday, 10/July/2021

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9:00am - 4:00pm	Source apportionment of mine pollution in watersheds: An introduction to the tracer dilution and synoptic sampling approach Chair: Patrick Byrne	"PITLAKQ" Modelling Pit Lakes: Modelling Hydrodynamics and Water Quality of Pit Lakes with PITLAKQ Chair: Mike Müller
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**Date: Sunday, 11/July/2021**

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**9:00am  
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4:00pm**

**Biotechnologies for the treatment of mining and metallurgical wastewater on the context of metal recovery**  
Chair: **Denys Villa Gomez**

**Practical Guide to Open Pit and Underground Mine Water Management**  
Chair: **Simon James Sholl**

**"PITLAKQ" Modelling Pit Lakes: Modelling Hydrodynamics and Water Quality of Pit Lakes with PITLAKQ**  
Chair: **Mike Müller**

Date: Monday, 12/July/2021

8:30am - 9:10am	<b>Opening Ceremony</b>		
9:10am - 10:00am	<b>Morning Session Monday</b> Chair: Christian Wolkersdorfer		
	<b>Overview of Metal &amp; Coal Mines in Wales</b> <b>Peter Brabham</b> Cardiff University, United Kingdom		
	<b>New Developments in Tailings Dam Monitoring</b> <b>Kym Lesley Morton</b> KLM Consulting Services, South Africa		
10:00am - 10:10am	<b>Health Break</b>		
10:10am - 12:15pm	<b>Mine Drainage Chemistry</b> Location: Meeting Room 1 Chair: <b>Christopher James Satterley</b>	<b>Mine Water Treatment</b> Location: Meeting Room 2 Chair: <b>Devin Sapsford</b>	<b>Waste Rock</b> Location: Meeting Room 3 Chair: <b>Trystan James</b>
	<b>10:10am - 10:35am</b> <b>Scour Protection Design Criteria for Mine Site Infrastructure</b> <b>David Christopher Westwater<sup>1</sup>, Krey Price<sup>2</sup></b> 1: Rio Tinto, Australia; 2: Surface Water Solutions	<b>10:10am - 10:35am</b> <b>Magnetic Coagulation Technology For Coal Gasification Wastewater Treatment</b> <b>Jianlei Gao<sup>1</sup>, Yan Liu<sup>1</sup>, Yixin Yan<sup>1</sup>, Wenhao Wang<sup>2</sup></b> 1: School of Ecology and Environment, Zhengzhou University 450001, Henan, China; 2: Zhengzhou University Design and Research Institute Co.Ltd., China	<b>10:10am - 10:35am</b> <b>Effects of pH on arsenic mineralogy and stability in Poldice Valley, Cornwall, United Kingdom</b> <b>Julian Tang<sup>1</sup>, Eric Oelkers<sup>2</sup>, Julien Declercq<sup>1</sup>, Rob Bowell<sup>1</sup></b> 1: SRK Consulting, 17 Churchill Way, Cardiff, CF10 2HH, UK; 2: University College London, Gower Street, London, WC1E 6BT, UK
	<b>10:35am - 11:00am</b> <b>REE Enrichment Pattern in Acid Mine Drainage and Overburden from Coal Mine in Indonesia</b> <b>Abie Badhurahman, Rudy Sayoga Gautama, Ginting Jalu Kusuma</b> Department of Mining Engineering, Institut Teknologi Bandung, Indonesia	<b>10:35am - 11:00am</b> <b>Tailings Facility Management: Modelling Tools for Life of Mine</b> <b>Roald Alexander Strand, Muhammad Parker, Jaco Grobler, Nigel Moon</b> Golder, Australia	<b>10:35am - 11:00am</b> <b>Mobilization Of Environmentally Hazardous Elements Dressing Tailings Of Loparite Ores Under Atmospheric Precipitation</b> <b>Eugenia Krasavtseva<sup>1,2</sup>, Dmitry Makarov<sup>1</sup>, Vladimir Masloboev<sup>1</sup>, Victoria Maksimova<sup>1,2</sup>, Anton Svetlov<sup>1</sup></b> 1: Institute of the industrial ecology problems of the North, Kola Science Center RAS, Russian Federation; 2: Laboratory of Nature-Inspired Technologies and Environmental Safety of the Arctic of the Federal Research Centre "Kola Science Centre of the Russian Academy of Sciences"
	<b>11:00am - 11:25am</b> <b>Natural Tracers For Mine Water Fingerprinting – A First Step To A Hydrogeochemical Monitoring Plan For Risk Assessment During Mine Water Rebound In The Ruhr District Area, Germany</b> <b>Henning Jasnowski-Peters, Christian Melchers</b> Research Center of Post Mining, Technische Hochschule Georg Agricola - University, Bochum, Germany	<b>11:00am - 11:25am</b> <b>Steel Slag-Limestone Reactor with Resistance to Fe: Laboratory and Pilot Scale Evaluations of Mn Treatment Efficiency</b> <b>Duk-Min Kim<sup>1,2</sup>, Youn-Soo Oh<sup>2,3</sup>, Hyun-Sung Park<sup>2</sup>, Dae-Gyu Im<sup>1</sup>, Woong-Lim Lim<sup>1</sup>, Hye-Rim Kwon<sup>1</sup>, Joon-Hak Lee<sup>2,4</sup></b> 1: Sangji University, Republic of Korea; 2: Korea Mine Reclamation Corporation (MIRECO), Republic of Korea; 3: Department of Earth and Environmental Sciences, Korea University, Republic of Korea; 4: Department of Earth Resources and Environmental Engineering, Hanyang University, Republic of Korea	<b>11:00am - 11:25am</b> <b>Variability in Mine Waste Mineralogy and Water Environment Risks: a Case Study on the River Almond Catchment, Scotland.</b> <b>Simon Haunch<sup>1</sup>, Alan MacDonald<sup>2</sup>, Christopher McDermott<sup>3</sup></b> 1: Scottish Environment Protection Agency, 231 Corstorphine Road, Edinburgh; 2: British Geological Survey, Research Avenue South, Edinburgh; 3: School of Geoscience, Grant Institute, James Hutton Road, Edinburgh
	<b>11:25am - 11:50am</b> <b>Simulation of Column Leach Tests using Reactive Transport Modelling</b> <b>Yuan Tian<sup>1</sup>, Johan Fourie<sup>2</sup>, Brent Usher<sup>2</sup></b> 1: Golder Associates, Australia; 2: Klohn Crippen Berger, Australia	<b>11:25am - 11:50am</b> <b>Final Treatment Trials On Cwm Rheidol - Ystumtuen Mines Discharges, Wales, Using Sono-electrochemistry (Electrolysis With Assisted Power Ultrasound)</b> <b>Peter Clive Stanley<sup>1</sup>, Chris Bullen<sup>2</sup></b> 1: Natural Resources Wales, United Kingdom; 2: Power & Water	<b>11:25am - 11:50am</b> <b>Assessing Heavy Elements In Tailings Water Around A Uranium Mine In Namibia</b>
	<b>11:50am - 12:15pm</b> <b>Application of Multivariate Statistical Analysis in Mine Water Hydrogeochemical Studies of the Outcropped Upper Carboniferous, Ruhr Area, Germany</b>		

**Tuan Quang Tran**<sup>1,2</sup>, **Andre Banning**<sup>1,3</sup>, **Stefan Wohnlich**<sup>1</sup>  
 1: Hydrogeology Department, Faculty of Geosciences, Ruhr University Bochum, Germany; 2: Hydrogeology Department, Faculty of Geosciences and Geoengineering, Hanoi University of Mining and Geology, Vietnam; 3: School of Biological, Earth and Environmental Sciences, University College Cork, Ireland

**11:50am - 12:15pm**  
**Scale-up of Electrochemical Units for Mining Waters Treatment**  
**Maria Mamelkina**, Ritva Tuunila, **Antti Häkkinen**  
 LUT University, Finland

**Vera Uushona**<sup>1,2</sup>, **Manny Mathuthu**<sup>1</sup>  
 1: North-West University (Mafikeng), South Africa; 2: National Radiation Protection Authority of Namibia, Ministry of Health and Social Services, Harvey Street, Namibia

**11:50am - 12:15pm**  
**The Use of Industrial Alkaline Wastes to Neutralise Acid Drain Water from Waste Rock Piles**  
**Nikolay Maksimovich**, Vadim Khmurchik, Olga Meshcheriakova, **Artem Demenev**, **Olga Berezina**  
 Natural Science Institute of Perm State University, Russian Federation

<b>12:15pm - 1:00pm</b>	<b>Lunch</b>		
<b>1:00pm - 3:30pm</b>	<p><b>Mine Drainage Chemistry</b>          Location: Meeting Room 1          Chair: <b>Peter Clive Stanley</b></p> <p><b>1:00pm - 1:25pm</b>  <b>Design, Operation, and Preliminary Findings from a Field Acid Rock Drainage (ARD) Study at the Bagdad Copper Mine in Arizona</b>  <b>Madhumitha Raghav</b><sup>1</sup>, Jessica Szaro<sup>1</sup>, Trika Graham<sup>2</sup>, Brent Callen<sup>2</sup>          1: Freeport-McMoRan, Inc.; 2: Freeport-McMoRan Bagdad, Inc.</p> <p><b>1:25pm - 1:50pm</b>  <b>Trace Element (As, F, U) Contamination and Hydrogeochemistry in the Vicinity of a Mexican Ore Mine</b>  <b>Andre Banning</b><sup>1,2</sup>, Desiree Schwertfeger<sup>1</sup>, Sócrates Alonso Torres<sup>3</sup>, Antonio Cardona Benavides<sup>4</sup>          1: Hydrogeology Department, Faculty of Geosciences, Ruhr University Bochum, Germany; 2: School of Biological, Earth and Environmental Sciences, University College Cork, Ireland; 3: Postgraduate Program in Minerals Engineering, Faculty of Engineering, Universidad Autónoma de San Luis Potosí, Mexico; 4: Earth Sciences Department, Faculty of Engineering, Universidad Autónoma de San Luis Potosí, Mexico</p> <p><b>1:50pm - 2:15pm</b>  <b>Effect of Mining to Water Quality in Chua and Revuê Rivers, Mozambique</b>  <b>Clemencio Nhandumbo</b><sup>1</sup>, Estevao Pondja<sup>1</sup>, Dinis Juizo<sup>1</sup>, Antonio Cumbane<sup>1</sup>, Nelson Matsinhe<sup>1</sup>, Bruno Paqueleque<sup>1</sup>, Miguel Uamusse<sup>1</sup>, Gretchen Gettel<sup>2</sup>, Mário Franca<sup>2,3</sup>, Paolo Paron<sup>2</sup>          1: Universidade Eduardo Mondlane, Mozambique; 2: IHE-Delft Institute for Water Education; 3: Delft University of Technology</p> <p><b>2:15pm - 2:40pm</b>  <b>Efficacies of Pervious Concrete and Zero-valent iron as Reactive Media for Treating</b></p>	<p><b>Mine Water Treatment &amp; Benefits Enhancement</b>          Location: Meeting Room 2          Chair: <b>Rhys John Savage</b></p> <p><b>1:00pm - 1:25pm</b>  <b>Process For The Subsoil Treatment Of Acidified Groundwater Through Microbial Sulfate Reduction</b>  <b>Ralph Schöpke</b><sup>1</sup>, Manja Walko<sup>2</sup>, Konrad Thürmer<sup>3</sup>          1: Brandenburgische Technische Universität Cottbus-Senftenberg, Germany; 2: Lausitzer und Mitteldeutsche Bergbau-Verwaltungsgesellschaft mbH; 3: Institut für Wasserwirtschaft, Siedlungswasserbau und Ökologie (IWSÖ GmbH)</p> <p><b>1:25pm - 1:50pm</b>  <b>Solvent Extraction To Recover Copper From Extreme Acid Mine Drainage</b>  <b>Amir Nobahar</b><sup>1,2</sup>, Alemu Melka<sup>1,2</sup>, Jorge Carlier<sup>1</sup>, Maria Clara Costa<sup>1,2</sup>          1: Centre of Marine Sciences (CCMAR), University of the Algarve, Gambelas Campus, 8005-139 Faro, Portugal; 2: Faculty of Sciences and Technology, University of the Algarve, Gambelas Campus, 8005 139 Faro, Portugal</p> <p><b>1:50pm - 2:15pm</b>  <b>Enhancing Biological Nitrogen Removal from Mine Site Water in Cold Climate</b>  <b>Pia Juholin</b><sup>1</sup>, Kirsi-Marja Haanpää<sup>1</sup>, Elena Torres<sup>2</sup>, Fernando Morgan-Sagastume<sup>2</sup>          1: AFRY Finland Oy; 2: AnoxKaldnes - Veolia Water Technologies AB</p> <p><b>2:15pm - 2:40pm</b>  <b>Innovative Adaptation of Mining Hydrogeology Practices during a Pandemic</b>  <b>Sofia Nazaruk</b>, <b>Grace Yungwirth</b>, <b>Jessica Nicholls</b>, <b>Gareth Digges La Touche</b>          Golder Associates (UK) Limited</p> <p><b>2:40pm - 3:05pm</b>  <b>Employment Of A Double Continuum Model To</b></p>	<p><b>Waste Rock</b>          Location: Meeting Room 3          Chair: <b>Andrew Barnes</b></p> <p><b>1:25pm - 1:50pm</b>  <b>The Relationships Between Negative Pore-water Potential, Water Content, Relative Humidity and Sulfide Oxidation in Waste Rock -- a Case Study</b>  <b>Eben Dy</b><sup>1</sup>, Kidus Tufa<sup>1</sup>, Elizabeth Fisher<sup>1</sup>, Zhong-Sheng {Simon} Liu<sup>1</sup>, Kevin Morin<sup>2</sup>, Michael O'Kane<sup>3</sup>, Tim O'Hearn<sup>4</sup>, Cheng Huang<sup>1</sup>, Qu Wei<sup>1</sup>          1: National Research Council Canada; 2: Minesite Drainage Assessment Group; 3: O'Kane Consultants Inc.; 4: Bureau Veritas</p> <p><b>1:50pm - 2:15pm</b>  <b>Numerical Modelling of Transient Groundwater Flow and Contaminant Transport at the Myra Falls Mine Site</b>  <b>Mahmoud Hussein</b><sup>1</sup>, Paul Ferguson<sup>1</sup>, Christoph Wels<sup>1</sup>, Nicole Pesonen<sup>2</sup>          1: Robertson GeoConsultants Inc. (RGC), Canada; 2: Nyrstar Myra Falls, Campbell River, Canada</p> <p><b>2:15pm - 2:40pm</b>  <b>Quantification of Environmental Risk of U and Th in Witwatersrand Gold-Mine Tailings, South Africa</b>  <b>Robert Neill Hansen</b>          University of the Free State, South Africa</p> <p><b>2:40pm - 3:05pm</b>  <b>A Multicomponent Reactive Transport Modeling Toolbox for Prediction of Drainage Quality from Mine Waste Facilities</b>  <b>Muhammad Muniruzzaman</b><sup>1</sup>, Teemu Karlsson<sup>2</sup>, Päivi M. Kauppila<sup>2</sup>          1: Water Management Solutions, Geological Survey of Finland, Finland; 2: Circular Economy Solutions, Geological Survey of Finland, Finland</p>

### **Acid Mine Drainage**

**Ayanda Nomaswazi Shabalala**  
University of Mpumalanga, South Africa

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**2:40pm - 3:05pm**

### **Prediction Of Water Quality Parameters Using Unmanned Aerial Vehicle Multispectral Imagery In Acidic Water Bodies In The Iberian Pyrite Belt (Tharsis, SW Spain)**

**Melisa Alejandra Isgró**<sup>1,2</sup>, **María Dolores Basallote**<sup>1</sup>, **Luis Barbero**<sup>2</sup>

1: Department of Earth Sciences, Research Center on Natural Resources, Health and the Environment (RENSMA), University of Huelva, Campus El Carmen s/n, 21071 Huelva, Spain; 2: Department of Earth Sciences, University of Cádiz, Campus Universitario de Puerto Real, 11510 Puerto Real, Cádiz, Spain

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**3:05pm - 3:30pm**

### **Surface Water on the Influence of the Carajás Mineral Province (Brazil) – Consequences to an Indigenous Community**

**Helena Côrrea**<sup>1</sup>, **Margarida Horta Antunes**<sup>2</sup>, **Paula Marinho Reis**<sup>3</sup>

1: ICT/University of Minho, Portugal;  
2: ICT/University of Minho, Portugal;  
3: ICT/University of Minho, Portugal

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### **Characterize Groundwater Flow In Underground Post-Mining Setups: Case Study Of The Ibbenbüren Westfield**

**Diego Bedoya-Gonzalez**<sup>1,2</sup>, **Timo Kessler**<sup>2</sup>, **Maria-Theresia Schafmeister**<sup>2</sup>

1: Department of Geography and Geology, University of Salzburg, Austria; 2: Institute for Geography and Geology, University of Greifswald, Germany

**5:00pm**  
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**6:30pm**

**General IMWA Assembly**

Date: Tuesday, 13/July/2021

<p>8:45am - 9:40am</p>	<p>Morning Session Tuesday Chair: Robert Vaughan</p> <p><b>Tools to Assess the Benefits of Mine Water Management: Economic and Social Valuation of Ecosystem Services</b> <u>Mike Christie</u> Aberystwyth University, United Kingdom</p> <hr/> <p><b>Creating Opportunities from the UK's Mining Legacy</b> <u>Lisa Pinney</u> Coal Authority, United Kingdom</p>		
<p>9:40am - 9:50am</p>	<p>Health Break</p>		
<p>9:50am - 12:20pm</p>	<p><b>Cultural &amp; Benefits Enhancement</b> Location: Meeting Room 1 Chair: Louise Siddorn</p> <p>9:50am - 10:15am <b>Tailings dam failure: Estimation of Outflow Volume</b> <u>Amir Keshtgar</u> GHD, Australia</p> <hr/> <p>10:15am - 10:40am <b>Cultural Aspects Constraining Mine Water Supply Chain Management In Asal Areas Of Kitui County, Kenya</b> <u>Erastus Kiswili Nyile</u><sup>1,2</sup>, Joash Kibet Kirwah<sup>2</sup> 1: Taita Taveta University, Kenya; 2: Jomo Kenyatta University of Agriculture and Technology</p> <hr/> <p>10:40am - 11:05am <b>Youth Participation and Inclusivity in Mine Water Sustainability in Kitui County, Kenya</b> <u>Erastus Kiswili Nyile</u><sup>1,2</sup>, Joash Kirwah Kibet<sup>2</sup> 1: Taita Taveta University, Kenya; 2: Jomo Kenyatta University of Agriculture and Technology, Kenya</p> <hr/> <p>11:05am - 11:30am <b>Developing Integrated Water Management Models To Address Water Related Risks And Provide Resilience In The Mining Industry</b> <u>Scott Gregory Anderson, Tyler Tinkler</u> GHD, Australia</p> <hr/> <p>11:30am - 11:55am <b>Utilization Of Mine Waste To Produce Sustainable Housing Materials For Artisanal Miners And The Surrounding Communities -A Case Study Of Mkuki, Taita Taveta County, Kenya</b> <u>Phillis Mutheu Mbinda</u> TAITA TAVETA UNIVERSITY, Kenya</p> <hr/> <p><b>Application of Artificial Intelligence Systems in Mine Water Management – An</b></p>	<p><b>Cleaning Up</b> Location: Meeting Room 2 Chair: Robert Vaughan</p> <p>9:50am - 10:15am <b>A UK progress overview of Metal Mine Remedial Work</b> <u>Peter Clive Stanley</u><sup>1</sup>, Potter Hugh<sup>2</sup> 1: Natural Resources Wales, United Kingdom; 2: Environment Agency, United Kingdom</p> <hr/> <p>10:15am - 10:40am <b>A GIS-Based Prioritisation Of Coastal Legacy Mine Spoil Deposits In England And Wales For Effective Future Management</b> <u>Alex L. Riley</u><sup>1</sup>, Patrizia Onnis<sup>2</sup>, Elin Jennings<sup>2</sup>, Richard A. Crane<sup>2</sup>, Karen A. Hudson-Edwards<sup>2</sup>, Sean D.W. Comber<sup>3</sup>, Ian T. Burke<sup>4</sup>, Patrick Byrne<sup>5</sup>, Catherine J. Gandy<sup>6</sup>, Adam P. Jarvis<sup>6</sup>, William M. Mayes<sup>1</sup> 1: Department of Geography, Geology and Environment, University of Hull, Hull, HU6 7RX, UK; 2: Environment &amp; Sustainability Institute and Camborne School of Mines, University of Exeter, Penryn, TR10 9DF, UK; 3: School of Geography, Earth and Environmental Sciences, Plymouth University, Plymouth, PL4 8AA, UK; 4: School of Earth and Environment, University of Leeds, Leeds, LS2 9JT, UK; 5: School of Biological and Environmental Sciences, Liverpool John Moores University, Liverpool, L3 3AF, UK; 6: School of Engineering, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK</p> <hr/> <p>10:40am - 11:05am <b>Emerging Opportunities for Improving Legacy Metal Mine Water Pollution Driven by Changing Regulatory Environments and Outputs of Novel Fieldwork in the Southern Uplands of Scotland.</b> <u>Alan Yendell</u><sup>1</sup>, Patrick Byrne<sup>2</sup> 1: Scottish Environment Protection Agency, United Kingdom; 2: Liverpool John Moores University, United Kingdom</p> <hr/> <p>11:05am - 11:30am</p>	<p><b>Passive Treatment</b> Location: Meeting Room 3 Chair: William Timothy Perkins</p> <p>9:50am - 10:15am <b>Lake Kepwari: Western Australia's First Successfully Relinquished Mine Lake.</b> <u>Cherie McCullough</u> Mine Lakes Consulting, Australia</p> <hr/> <p>10:15am - 10:40am <b>Passive Treatment Of AMD Using a Full-Scale Up-Flow Mussel Shell Reactor, Bellvue Coal Mine, New Zealand</b> <u>Dave Trumm</u>, James Pope, Hana Christenson Verum Group, New Zealand</p> <hr/> <p>10:40am - 11:05am <b>Full-scale Compact Passive Treatment System for a Japanese AMD by Aerobic Bioreactor for Fe Removal and Sulfate Reducing Bacteria Bioreactor for Zn Removal</b> <u>Kentaro Hayashi</u>, Tsubasa Washio, Yusei Masaki, Takaya Hamai, Takeshi Sakata, Naoki Sato Japan Oil, Gas and Metals National Corporation, Japan</p> <hr/> <p>11:05am - 11:30am <b>Successful Passive Treatment of Sulfate Rich Water</b> <u>James Donald Fraser Robinson</u><sup>1</sup>, Ian Andrews<sup>2</sup>, Jason Dodd<sup>3</sup> 1: SLR Consulting Limited, United Kingdom; 2: SLR Consulting Limited, United Kingdom; 3: SLR Consulting Limited, United Kingdom</p> <hr/> <p><b>Groundwater Nitrate Bioremediation of a Fractured Rock Aquifer System in South Africa</b> <u>Paul Lourens</u><sup>1</sup>, Mariana Erasmus<sup>2</sup>, Robert Hansen<sup>3</sup>, Amy Allwright<sup>1</sup> 1: Institute for Groundwater Studies, Faculty of Natural and Agricultural Sciences, University of the Free State; 2: Saense Platform, Department of Microbial Biochemical and Food Biotechnology, Faculty of Natural and Agricultural Sciences, University of the Free State; 3:</p>

	<p><b>Introduction to two Effective Predictive Models</b>  <u>Kagiso Samuel More</u>, Christian Walkersdorfer  Tshwane University of Technology (TUT), South Africa</p>	<p><b>Challenges of Watershed Mine Drainage Characterisation and Remediation at Scale: Force Crag Base Metal Mine, Cumbria, UK</b>  <u>Catherine J Gandy</u><sup>1</sup>, Adam P Jarvis<sup>1</sup>, Nick Cox<sup>2</sup>, Stephen Lofts<sup>3</sup>, John Malley<sup>4</sup>, Arabella M L Moorhouse-Parry<sup>2</sup>, Katherine S Neate<sup>1</sup>, Barbara Palumbo-Roe<sup>5</sup>, Hugh A B Potter<sup>6</sup>  1: Newcastle University, United Kingdom; 2: The Coal Authority, United Kingdom; 3: UK Centre for Ecology &amp; Hydrology, United Kingdom; 4: National Trust, United Kingdom; 5: British Geological Survey, United Kingdom; 6: Environment Agency, United Kingdom</p> <hr/> <p><b>11:30am - 11:55am</b>  <b>Numerical Modelling of Mine Pollution to Inform Remediation Decision-making in Watersheds</b>  <u>Patrick Byrne</u><sup>1</sup>, Patrizia Onnis<sup>1,2</sup>, Robert L Runkel<sup>3</sup>, Ilaria Frau<sup>1</sup>, Sarah F L Lynch<sup>4</sup>, Aaron M L Brown<sup>5</sup>, Iain Robertson<sup>5</sup>, Paul Edwards<sup>6</sup>  1: Liverpool John Moore's University, United Kingdom; 2: University of Exeter, United Kingdom; 3: U.S. Geological Survey, USA; 4: AECOM Ltd. United Kingdom; 5: Swansea University, United Kingdom; 6: Natural Resources Wales</p> <hr/> <p><b>11:55am - 12:20pm</b>  <b>Source Apportionment of Trace Metals at the Abandoned Nantymwyn Lead-Zinc Mine, Wales</b>  <u>Aaron Martin Lawrence Brown</u><sup>1</sup>, Iain Robertson<sup>1</sup>, Rory P.D. Walsh<sup>1</sup>, Patrick Byrne<sup>2</sup>, Paul Edwards<sup>3</sup>, Tom Williams<sup>3</sup>  1: Swansea University, United Kingdom; 2: School of Biological and Environmental Sciences, Liverpool John Moores University, Liverpool L3 3AF, UK; 3: Natural Resources Wales, Faraday Building, Swansea University, Swansea SA2 8PP, UK</p>	<p>Department of Geology, Faculty of Natural and Agricultural Sciences, University of the Free State</p> <hr/> <p><b>11:30am - 11:55am</b>  <b>Mobilization of Bound Arsenic and Antimony from Peat used for the Treatment of Mining-Affected Waters</b>  Uzair Akbar Khan<sup>1</sup>, Vera Luostarinen<sup>1</sup>, Aileen Ziegelhöfer<sup>1,2</sup>, <u>Katharina Kujala</u><sup>1</sup>  1: University of Oulu, Finland; 2: University of Applied Sciences FH Aachen, Germany</p>
<p><b>12:20pm - 1:00pm</b></p>	<p><b>Lunch</b></p>		
<p><b>1:00pm - 3:05pm</b></p>	<p><b>Legacy Mine Impacts</b>  Location: Meeting Room 1  Chair: <b>Steven Richard Pearce</b></p> <hr/> <p><b>1:00pm - 1:25pm</b>  <b>Investigating the sulfidation and high-temperature (100 °C – 200 °C) dissolution of As<sub>2</sub>O<sub>3</sub> stored at the Giant Mine, NWT, Canada</b>  <u>Evelyn Tennant</u>, Tom Al University of Ottawa, Canada</p> <hr/> <p><b>1:25pm - 1:50pm</b>  <b>Effects of Coal Mining on the Lower Zambezi Basin, Tete Province, Mozambique</b>  <u>Vibeke Johansson</u><sup>1</sup>, Estêvão</p>	<p><b>Mine Water Treatment</b>  Location: Meeting Room 2  Chair: <b>Ian Jones</b></p> <hr/> <p><b>1:00pm - 1:25pm</b>  <b>Refurbishment Of Water Treatment Plant Borna-West – From Lab Over Pilot Scale To Operation Plant Modification</b>  <u>Tim Aube</u><sup>1</sup>, Falk Thürigen<sup>1</sup>, Roland Mayer<sup>1</sup>, Andre Hertzsch<sup>2</sup>  1: G.E.O.S. Ingenieurgesellschaft mbH, Germany; 2: Lausitzer und Mitteldeutsche Bergbau-Verwaltungsgesellschaft mbH, Germany</p> <hr/> <p><b>1:25pm - 1:50pm</b>  <b>In-situ Hydrogen Peroxide</b></p>	<p><b>Mine Hydrogeology</b>  Location: Meeting Room 3  Chair: <b>Edward Austin</b></p> <hr/> <p><b>1:00pm - 1:25pm</b>  <b>Investigating Subvertical Dewatering Well Potential At An Open Pit Mine</b>  <u>Patrick Moran</u>, Joe Ross, Ramsey Way, Rod Williams  Iron Ore Company Of Canada (IOC) / Rio Tinto, Canada</p> <hr/> <p><b>1:25pm - 1:50pm</b>  <b>Slope Depressurisation at Sishen Mine, Northern Cape, South Africa</b>  <u>Travis Hamilton White</u>, Marnus Bester, Richard Carey</p>

**Pondja<sup>2</sup>, Kenneth M. Persson<sup>1</sup>**

1: Division of Water Resource Engineering, Lund University, Lund, Sweden; 2: Chemical Engineering Department, Eduardo Mondlane University, Maputo, Mozambique

**1:50pm - 2:15pm**

**Treatability Trials To Remove Zinc From Abbey Consols Mine Water, Wales, UK**

**Tom Williams<sup>1</sup>, Julia Dent<sup>2</sup>, Thomas Eckhardt<sup>2</sup>, Matt Riding<sup>2</sup>, Devin Sapsford<sup>3</sup>**

1: Natural Resources Wales; 2: WSP Ltd; 3: Cardiff University

**2:15pm - 2:40pm**

**Passive Mine Water Treatment Trials of Dispersed Alkaline Substrate at Two Emblematic Mine Sites in Wales**

**Tobias Stefan Roetting<sup>1</sup>, Gareth Digges La Touche<sup>1</sup>, Iain Hall<sup>2</sup>, Louise Siddorn<sup>3</sup>, Peter Clive Stanley<sup>3</sup>, José Miguel Nieto<sup>4</sup>, Francisco Macías Suárez<sup>4</sup>, Alba Gómez Arias<sup>5,6</sup>, Julio Castillo<sup>6</sup>**

1: Golder Associates UK Ltd, 20 Eastbourne Terrace, London, W2 6LG, UK; 2: Golder Associates UK Ltd, Citibase Edinburgh Gyleview, Gyleview House, 3 Redheughs Rigg, Edinburgh West Office Park, South Gyle, EH12 9DQ, UK; 3: Natural Resources Wales, 29 Newport Road, Cardiff CF24 0TP, Wales; 4: Department of Earth Sciences & Research Center on Natural Resources, Health and the Environment (RENSMA), University of Huelva, Avenida Tres de Marzo s/n, 21071 Huelva, Spain; 5: Office for Research Commercialisation, University of the Free State, PO Box 339, Bloemfontein 9300, Republic of South Africa; 6: Department of Microbiology and Biochemistry, University of the Free State, PO Box 339, Bloemfontein 9300, Republic of South Africa

**2:40pm - 3:05pm**

**Should Irrigation With Mine-Affected Water Be Considered Part Of The Long-Term Strategy To Manage Acid Mine Drainage In The Witwatersrand Goldfields?**

**John George Annandale, Meiring du Plessis, Phil Tanner, Sarah Heuer**

University of Pretoria, South Africa

**Dosing Trials To Design Semi-Passive Treatment Schemes**

**Michael Alan Cox, Christopher Satterley, Waqas Ahmed, Benjamin Cordier**

The Coal Authority, United Kingdom

**1:50pm - 2:15pm**

**Osmodialysis - the Future of Oil Production Water Treatment**

**Matthias Fuhrland, Thomas Griessler**

fluvicon GmbH, Austria

**2:15pm - 2:40pm**

**Prevention of Siltation in Artisanal Small-scale Mining**

**Esther Takaluoma<sup>1</sup>, Tatiana Samarina<sup>1</sup>, Antti Peronius<sup>2</sup>**

1: Kajaani University of Applied Sciences, Finland; 2: Hangasojan Kulta Oy, Consulting company, Finland

**2:40pm - 3:05pm**

**Mintek's Integrated cloSURE(TM) Technology for Treatment of Acid Mine Drainage**

**Kerri du Preez**

Mintek, South Africa

Anglo American Kumba Iron Ore, South Africa

**1:50pm - 2:15pm**

**The Use of Mineral Exploration Drilling to Kickstart Hydrogeology Data Collection for Pre-Feasibility Mining Studies and Beyond.**

**Kym Lesley Morton**

KLM Consulting Services, South Africa

**2:15pm - 2:40pm**

**Application Of Detailed Interval Flow Data Measured In Drillholes With PFL Tool In Hydrogeological Conceptualization And Numerical Flow Modelling For Mine Feasibility Scoping**

**Elias Pentti, Eero Heikkinen, Tiina Vaittinen**

AFRY Finland Oy, Finland

**2:40pm - 3:05pm**

**Spatial and Temporal Changes of Physico-Chemistry Aspects of Mine Water, Due to Post-Closure Water Management**

**Lee M Wyatt, Jack Cropper, Ian A Watson**

Coal Authority, United Kingdom

**3:00pm - 5:00pm**

**Poster**

Location: Exhibition

**The Effects Of Using Hydrogen Peroxide To Provide An Improved HDS Process**

**Jodie Evans<sup>1</sup>, Richard Morgan<sup>1</sup>, Richard Coulton<sup>2</sup>**

1: Siltbuster Ltd, United Kingdom; 2: Materials Recovery Systems Ltd, United Kingdom

**Distribution of Metals and Toxic Elements Between Carbonate, Sulfate, and Oxide Mineral Precipitates**

**Julie J. Kim<sup>1</sup>, Satish C.B. Myneni<sup>2</sup>, Catherine A. Peters<sup>1</sup>**

1: Department of Civil and Environmental Engineering, Princeton University, USA; 2: Department of Geosciences, Princeton University, USA



## **Geochemical sources and long-term implications of mine waste weathering, Cwmystwyth Mine, Wales**

**Rob Bowell**<sup>2,3</sup>, **Yulieth Marquinez**<sup>1,2</sup>, **Tim Jones**<sup>2</sup>, **Peter Braham**<sup>2</sup>

1: Palatine House, United Kingdom; 2: Cardiff University, United Kingdom; 3: SRK Consulting, United Kingdom

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## **Modelling the Geochemical Behaviour of Desulfurized Tailings as a Moisture-Retaining Layer in Insulation Covers with Capillary Barrier Effects using MIN3P-THCm**

**Asif Qureshi**, **Bruno Bussière**

Institut de recherche en mines et environnement (IRME), Université of Québec in Abitibi-Témiscamingue, Canada

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## **Assessment of the Chemical and Ecological Recovery of the Frongoch Stream Following Remediation at Frongoch Lead and Zinc Mine, Mid Wales**

**Paul John Edwards**<sup>1</sup>, **John F. Murphy**<sup>2</sup>, **J. Iwan Jones**<sup>2</sup>, **Chloe Morgan**<sup>1</sup>, **Rory P.D. Walsh**<sup>3</sup>, **Julie Gething**<sup>1</sup>

1: Natural Resources Wales, United Kingdom; 2: Queen Mary University of London, United Kingdom; 3: Swansea University, United Kingdom

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## **Numerical Groundwater Flow Modelling In Support Of Mine Water Supply In An Endoreic Groundwater System, Tasiast Mine, Mauritania**

**Martin Boland**<sup>1</sup>, **Florent Boddaert**<sup>1</sup>, **Geoff Beale**<sup>1</sup>, **Glen Hein**<sup>2</sup>, **Pieter Labuschagne**<sup>3</sup>, **Ryan Cox**<sup>4</sup>

1: Piteau Associates, United Kingdom; 2: Kinross Gold Corporation; 3: GCS; 4: GEM Ltd

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## **"Extension Of Measuring Points Network For The Upper Aquifers Of RAG Aktiengesellschaft Through The Drilling Pferdekamp"**

**Christine von Kleinsorgen**

RAG Aktiengesellschaft, Germany

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## **Methods of Environmental Bioindication of Rivers Prone to Technogenic Salinization**

**Mikhail Baklanov**<sup>1</sup>, **Pavel Mikheev**<sup>1,2</sup>, **Olga Mikheeva**<sup>3</sup>, **Tatiana Sheina**<sup>1</sup>, **Elena Khayrulina**<sup>1</sup>

1: Federal State Autonomous Educational Institution of Higher Education "Perm State National Research University", Perm, Perm, Russia; 2: Khabarovsk Branch of the Federal State Budget Scientific Institution "Russian Federal Research Institute of Fisheries and Oceanography" ("KhabarovskNIRO"), Khabarovsk, Russia; 3: Perm Branch of the Federal State Budget Scientific Institution "Russian Federal Research Institute of Fisheries and Oceanography" ("PermNIRO"), Perm, Russia

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## **Systematic Approach in Environmental Geochemistry as Part of a Mining Project Roadmap**

**Päivi Picken**, **Anneli Wichmann**, **Eeva-Leena Anttila**, **Kirsi-Marja Haanpää**, **Elin Siggberg**

AFRY Finland Oy, Finland

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## **Repurposing Mine Sites For The Well-being Of Future Generations: Innovative Examples And Case Study Of Developing Post Mining Remedial Work In Wales**

**Peter Clive Stanley**<sup>1</sup>, **Trystan James**<sup>1</sup>, **Bob Vaughan**<sup>1</sup>, **Steven Pearce**<sup>2</sup>

1: Natural Resources Wales, United Kingdom; 2: Mine Environment Management Ltd.

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## **Selective Recovery of Copper and Cobalt from Mine Effluent**

**Esther Takaluoma**<sup>1</sup>, **Tatiana Samarina**<sup>1</sup>, **Gershom Mwandila**<sup>2</sup>, **Leonard Kabondo**<sup>2</sup>, **Kawunga Nyirenda**<sup>2</sup>, **Phenny Mwaanga**<sup>2</sup>

1: Kajaani University of Applied Science, Ketunpolku 1, FI-87100 Kajaani, Finland; 2: Copperbelt University, School of Mines and Mineral Sciences, 4662 Jambo Drive, Riverside, Kitwe, Zambia

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## **Integrated Dynamic Mine Water Balance Modelling with EcoBalance Model Libraries**

**Kirsi-Marja Haanpää**<sup>1</sup>, **Jacobus J. Van Blerk**<sup>2</sup>, **Jacobus J.P. Vivier**<sup>3</sup>, **Eric K. Howell**<sup>4</sup>, **Rodolfo Avila**<sup>4</sup>

1: AFRY, Finland; 2: Aquisim Consulting Pty Ltd; 3: Artesium Consulting Services (Pty) Ltd; 4: AFRY, Sweden

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## **Evaluation Of Preferential Pathways For An Effective Dewatering And Depressurization Of The Aitik Open-Pit, Norrbotten, Sweden**

**Florent Boddaert**<sup>1</sup>, **Hannington Mwagalanyi**<sup>2</sup>, **Simon Sholl**<sup>1</sup>, **Geoff Beale**<sup>1</sup>

1: Piteau Associates, United Kingdom; 2: Boliden Mineral AB, Boliden Aitik, Sweden

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## **Utilisation Of Mine Water From Abandoned Mines - Example "Anthracite Mine Ibbenbüren", Germany**

**Marion Maria Stemke**, **Georg Wieber**

Johannes Gutenberg-Universität Mainz, Germany

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## **Study on Mechanism Analysis and Treatment Measures of Karst Water Disaster in Mines**

**Weitao Liu**, **Lifu Pang**, **Yanhui Du**

Shandong University of Science and Technology, China, People's Republic of

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## **Characterization of Arsenical Mud from Effluent Treatment of AU Concentration Plants, Minas Gerais – Brazil**

**Mariana Lemos**<sup>1</sup>, **Teresa Valente**<sup>1</sup>, **Paula Marinho**<sup>1</sup>, **Rita Fonseca**<sup>3</sup>, **José Gregório Filho**<sup>2</sup>, **José Augusto Dumont**<sup>2</sup>,

**Juliana Ventura<sup>2</sup>, Itamar Delben<sup>4</sup>**

1: Institute of Earth Sciences, Pole of University of Minho, University of Minho, Portugal; 2: Anglogold Ashanti, Mining & Technical, COO International, Brazil; 3: Institute of Earth Sciences, Pole of University of Évora, University of Évora, Portugal; 4: Microscopy Center, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil.

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**Mobility of Uranium in Groundwater-surface Water Systems in a Post-mining Context (Central Portugal)**

**Margarida Horta Antunes<sup>1</sup>, Paula Carvalho<sup>2</sup>, Teresa Albuquerque<sup>3</sup>, António Santos<sup>4</sup>**

1: University of Minho, Portugal; 2: University of Coimbra, MARE – Marine and Environmental Science Centre, Department of Life Sciences, Coimbra, Portugal; 3: Instituto Politécnico de Castelo Branco | CERNAS | QRural and ICT | Universidade de Évora; Portugal;; 4: GeoBioTec, Department of Geosciences, University of Aveiro, Aveiro, Portugal

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**Overflow Estimation: A Study of MWN Pit Lake on East Borneo**

**Fahmi Syaifudin<sup>1</sup>, Yogi Pratama<sup>1</sup>, Karina Sujatmiko<sup>2</sup>**

1: PT Kaltim Prima Coal, Indonesia; 2: Kansai University, Japan

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**Hydrogeochemistry and Mineralogy of a River System in a Mining Region with a Cu-world-class Deposit in Mongolia**

**Soyol-Erdene Tseren-Ochir<sup>1,2</sup>, Teresa Maria Valente<sup>3</sup>, Tsermaa Kh<sup>2,4</sup>, Enkhdul T<sup>1,5</sup>, Munkhzul Davaadorj<sup>2,6,7</sup>, Boldbaatar Goosh<sup>2,6,8</sup>, Maria Amália Sequeira Braga<sup>3</sup>**

1: Department of Environmental and Forest Engineering, National University of Mongolia; 2: Laboratory of Environmental Chemistry and Geochemistry, National University of Mongolia; 3: Institute of Earth Sciences – pole of University of Minho, University of Minho, Braga, Portugal; 4: Engineering Faculty, German Mongolian Institute for Resources and Technology, Nalaikh, Mongolia; 5: Laboratory of Environmental Engineering and Clean technology, National University of Mongolia; 6: Department of Chemical and Biological Engineering, National University of Mongolia; 7: Water Agency, Ministry of Environment and Tourism, Mongolia; 8: Water Supply and Sewerage Authority, Ulaanbaatar city Governance, Mongolia

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**Acid Mine Drainage Precipitates At The Nanometric Scale – Properties And Environmental Role**

**Teresa Valente<sup>1</sup>, Ana Barroso<sup>1</sup>, Isabel Margarida Antunes<sup>1</sup>, Patricia Gomes<sup>1</sup>, Rita Fonseca<sup>2</sup>, Catarina Pinho<sup>2</sup>, Jorge Pamplona<sup>1</sup>, Maria Amália Sequeira Braga<sup>1</sup>, Juliana P.S. Sousa<sup>3</sup>**

1: Universidade do Minho, Portugal; 2: Universidade de Évora; 3: International Iberian Nanotechnology Laboratory

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**Shear Behaviour of Compacted Gold Mine Tailings and Gold Mine Tailings Composite for Possible Use in Mine Backfilling.**

**Sisanda Prudence Gcasamba<sup>1</sup>, Koena Ramasenya<sup>1</sup>, Viswanath Vadapalli<sup>1</sup>, Stephen Ekoru<sup>2</sup>, Sammy Nyale<sup>1</sup>**

1: Council for Geoscience, South Africa; 2: University of Johannesburg, South Africa

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**Efficient Methodologies in the Treatment of Acid Water from Mines with Recovery of Byproducts**

**Oswaldo Aduvire<sup>1</sup>, Mayra Montesinos<sup>2</sup>, Nereyda Loza<sup>3</sup>**

1: SRK Consulting Peru, Peru; 2: Pontifical Catholic University of Peru, Peru; 3: SRK Consulting Peru, Peru

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5:00pm  
-  
7:00pm

Social Online Gathering

Date: Wednesday, 14/July/2021

<p>8:45am - 9:40am</p>	<p><b>Morning Session Wednesday</b> Chair: <b>Carl Banton</b></p> <p><b>Biotechnologies for the Treatment of Mining and Metallurgical Wastewater on the Context of Metal Recovery</b> <b>Denys Villa Gomez</b> University of Queensland, Australia</p> <hr/> <p><b>Passive Mine Water Treatment in the UK – a view from Wales</b> <b>William Timothy Perkins</b> Aberystwyth University, United Kingdom</p>		
<p>9:40am - 9:50am</p>	<p><b>Health Break</b></p>		
<p>9:50am - 11:55am</p>	<p><b>Ecology</b> Location: Meeting Room 1 Chair: <b>Paul John Edwards</b></p> <p><b>9:50am - 10:15am</b> <b>The Effects Of Storm Events On Sediment, Nutrient, And Biofilm Dynamics In A Stream Recovering From Acid Mine Drainage</b> <b>Natalie A Kruse Daniels<sup>1</sup>, Jennie Brancho<sup>1</sup>, Morgan L Vis<sup>2</sup></b> 1: Environmental Studies Program, Voinovich School of Leadership and Public Affairs, Ohio University, United States of America; 2: Environmental and Plant Biology Department, Ohio University, United States of America</p> <p><b>10:15am - 10:40am</b> <b>Effects of Vegetation on Erosion in Technosols Produced from Coal Waste</b> <b>Daniel Campos Moro, Jéssica Weiler, Ivo André Homrich Schneider</b> Universidade Federal do Rio Grande do Sul, Brazil</p> <p><b>10:40am - 11:05am</b> <b>Biodiversity Benefits Of Coal Mine Water Remediation Schemes For Bird Life</b> <b>Rosie O. Jaques<sup>1</sup>, Arabella M.L. Moorhouse-Parry<sup>2</sup>, Richard Carline<sup>2</sup>, William M. Mayes<sup>1</sup>, Susan L. Hull<sup>1</sup></b> 1: University of Hull, United Kingdom; 2: The Coal Authority, United Kingdom</p> <p><b>11:05am - 11:30am</b> <b>Long-time Effect of Ancient Salt Production (Perm Krai, Russia)</b> <b>Elena Khayrulina, Natalya Mitrakova</b> Perm State National Research University, Russian Federation</p> <p><b>11:30am - 11:55am</b> <b>Passive treatment of Acid Mine Drainage at Parys Mountain (Wales): column experiment results</b> <b>Jose Miguel Nieto<sup>1</sup>, Tobias Rötting<sup>2</sup>, Peter Stanley<sup>3</sup>, Louise</b></p>	<p><b>Passive Treatment &amp; Mine Closure</b> Location: Meeting Room 2 Chair: <b>Carl Banton</b></p> <p><b>9:50am - 10:15am</b> <b>Performances of a semi-passive field-pilot for bioremediation of As-rich Acid Mine Drainage at the Carnoulès mine (France)</b> <b>Camila Diaz-Vanegas<sup>1,2</sup>, Corinne Casiot<sup>1</sup>, Liming Lin<sup>3</sup>, Laurent De Windt<sup>4</sup>, Adam Djibrine<sup>2,3</sup>, Amandine Malcles<sup>3</sup>, Marina Héry<sup>1</sup>, Angélique Desoeuvre<sup>1</sup>, Odile Bruneel<sup>1</sup>, Fabienne Battaglia-Brunet<sup>2</sup>, Jerome Jacob<sup>2</sup></b> 1: HydroSciences Montpellier, University of Montpellier, CNRS, IRD, Montpellier, France; 2: French Geological Survey (BRGM), Water, Environment, Process and Analyses Division, Orléans, France; 3: France LGEI (Laboratoire de Génie de l'Environnement Industriel), Institut Mines-Télécom Alès, Alès, France; 4: MINES ParisTech, PSL University, Centre de Géosciences, Fontainebleau, France</p> <p><b>10:15am - 10:40am</b> <b>Performance Of The Hybrid Linear Flow Channel Reactor: Effect Of Reactors In Series For Enhanced Biological Sulphate Reduction And Sulphur Recovery</b> <b>Tynan Steven Marais<sup>1</sup>, Rob John Huddy<sup>1</sup>, Rob Paul van Hille<sup>2</sup>, Susan Therese Largier Harrison<sup>1</sup></b> 1: University of Cape Town, South Africa; 2: Moss Group</p> <p><b>10:40am - 11:05am</b> <b>Saline Pit Lakes – What Biodiversity Values Can They Offer At Closure And Beyond?</b> <b>Mark Lund, Melanie Blanchette</b> Mine Water and Environment Research Centre, Edith Cowan University, Australia</p> <p><b>11:05am - 11:30am</b> <b>Recharge-driven Underground Dewatering And Post-closure Groundwater Recovery</b> <b>Simon Sholl<sup>1</sup>, Stephen Wheston<sup>2</sup>,</b></p>	<p><b>Mine Hydrogeology</b> Location: Meeting Room 3 Chair: <b>Andrew Clifford Johnstone</b></p> <p><b>9:50am - 10:15am</b> <b>Using Data Science and Machine Learning to Improve Site Hydrogeological Conceptual Models</b> <b>Tim Robert Ezzy, John Fortuna</b> Principal Hydrogeologist, Golder Associates, Brisbane, Queensland, Australia</p> <p><b>10:15am - 10:40am</b> <b>Open Pit-Mine Water Management In Equatorial Area</b> <b>Yogi Pratama, Fahmi Syaifudin, Kris Pranoto</b> PT KALTIM PRIMA COAL, Indonesia</p> <p><b>10:40am - 11:05am</b> <b>A Set of New Technology and Equipment of Advanced Water Detection and Drainage in Coal Mining Face with Borehole Geophysical Exploration</b> <b>Qiang Wu<sup>1</sup>, Yifan Zeng<sup>1</sup>, Chunsheng Liu<sup>2</sup>, Honglei Liu<sup>1</sup>, Shouqiang Liu<sup>1</sup>, Fangpeng Cui<sup>1</sup>, Jingchuan Ma<sup>1</sup></b> 1: China University of Mining and Technology, Beijing, China, China, People's Republic of; 2: Wuhan Changsheng Coal Security Technology Co., Ltd., Wuhan 430312, China</p> <p><b>11:05am - 11:30am</b> <b>Influence of Coal Mining on Water Environment and Ecology in the Yellow River Basin</b> <b>Fawang Zhang<sup>1</sup>, Zhiqiang Zhang<sup>1,2,3</sup></b> 1: Chinese Academy of Geological Sciences, Beijing 100037, China; 2: Hefei University of Technology, Hefei 230009, China; 3: Hebei GEO University, Shijiazhuang 050031, China</p> <p><b>11:30am - 11:55am</b> <b>Incorporating 2D Analytical Results into 3D Graphical and Multidisciplinary Mining Models.</b></p>

	<p><b>Siddorn<sup>3</sup>, Francisco Macías<sup>1</sup>, José María Fuentes<sup>1</sup>, Rafael León<sup>1</sup>, Riccardo Millán<sup>1</sup></b>  1: University of Huelva, Spain; 2: Golder Associates, United Kingdom; 3: Natural Resources Wales, United Kingdom</p>	<p><b>Geoff Beale<sup>1</sup></b>  1: Piteau Associates, Canon Court West, Abbey Lawn, Shrewsbury SY5 8AN, United Kingdom; 2: Tembusu Ltd, 1 Killastafford Cross, Cashel, Co Tipperary, Ireland</p> <hr/> <p><b>11:30am - 11:55am</b>  <b>Finite-element Modelling Approach To Study Flow Processes During Groundwater Rebound In Abandoned Underground Hard Coal Mines</b>  <b>Timo Kessler, Maria-Theresia Schafmeister</b>  University of Greifswald, Germany</p>	<p><b>Hannah Redfern, James Catley, Grace Yungwirth</b>  Golder Associates (UK) Ltd</p>
<p><b>11:55am - 12:40pm</b></p>	<p><b>Lunch</b></p>		
<p><b>12:40pm - 2:45pm</b></p>	<p><b>Mine Drainage Chemistry &amp; Passive Treatment</b>  Location: Meeting Room 1  Chair: <b>Arabella Mary Louise Moorhouse-Parry</b></p> <hr/> <p><b>12:40pm - 1:05pm</b>  <b>Seasonal Geochemical Variation of Sediments in the Sabie River, Mpumalanga, South Africa</b>  <b>Rudzani Lusunzi<sup>1,2</sup>, Frans Waanders<sup>2</sup>, Robert Khashane Tshishonga Netshitungulwana<sup>1</sup></b>  1: Council for Geoscience, South Africa; 2: North West University, South Africa</p> <hr/> <p><b>1:05pm - 1:30pm</b>  <b>Evaluation Of A Short Period Increasing Water Influx In A Mine Drainage Facility Of A Former Hard Coal Mine</b>  <b>Birgitta Wiesner</b>  RAG AG, Germany</p> <hr/> <p><b>1:30pm - 1:55pm</b>  <b>Recovering Rare Earth Elements from Acid Mine Drainage with Mine Land Reclamation</b>  <b>Chin-Min Cheng, Tarunjit Butalia, John Lenhart, Jeffrey Bielicki</b>  The Ohio State University, United States of America</p> <hr/> <p><b>1:55pm - 2:20pm</b>  <b>Distributions of Rare Earth Elements in Coal Mine Drainages</b>  <b>Chin-Min Cheng, Tarunjit Butalia, John Lenhart, Jeffrey Bielicki</b>  The Ohio State University, United States of America</p> <hr/> <p><b>2:20pm - 2:45pm</b>  <b>Passive Solar Photocatalytic Treatment in Mining Process-affected Water</b>  <b>Jeffrey Thomas Martin<sup>1</sup>, Tim Leshuk<sup>1,2</sup>, Brad Wilson<sup>1,3</sup>, Zac Young<sup>1</sup>, Frank Gu<sup>1,2</sup></b>  1: H2nanO Inc., 151 Charles St. W., Suite 299, Kitchener, ON, Canada; 2: University of Toronto, Department of Chemical Engineering and Applied</p>	<p><b>Mine Water Treatment</b>  Location: Meeting Room 2  Chair: <b>Tobias Stefan Roetting</b></p> <hr/> <p><b>12:40pm - 1:05pm</b>  <b>History of Passive Treatment Technology Development in the United States</b>  <b>Jeff Skousen</b>  West Virginia University, United States of America</p> <hr/> <p><b>1:05pm - 1:30pm</b>  <b>Full-scale Reducing And Alkalinity Producing System (RAPS) For The Passive Remediation Of Polluted Mine Water From A Flooded Abandoned Underground Coal Mine, Carolina, South Africa</b>  <b>Gloria Dube<sup>1</sup>, Tebogo Mello<sup>1</sup>, Viswanath Vadapalli<sup>1</sup>, Henk Coetzee<sup>1</sup>, Kefyalew Tegegn<sup>1</sup>, Rudzani Lusunzi<sup>1</sup>, Shadung Moja<sup>1</sup>, Mafeto Malatji<sup>1</sup>, Munyadziwa Ethel Sinthumule<sup>2</sup>, Rudzani Ramatsekisa<sup>2</sup></b>  1: Council for Geoscience, South Africa; 2: Department of Mineral Resources and Energy</p> <hr/> <p><b>1:30pm - 1:55pm</b>  <b>A Strategy to Stimulate and Manage Indigenous Bacterial Communities to Effectively Remediate Mine Drainages</b>  <b>Gerhard Potgieter<sup>1</sup>, Errol Cason<sup>2</sup>, Mary Deflaun<sup>3</sup>, Estariëthe van Heerden<sup>1</sup></b>  1: iWater (pty) (ltd); 2: University of the Free state; 3: Geosyntec Consultants</p> <hr/> <p><b>1:55pm - 2:20pm</b>  <b>On-site XRF Analysis of Metal Concentrations of Natural Waters</b>  <b>Tommi Tiihonen<sup>1</sup>, Tuomo Nissinen<sup>2</sup>, Joakim Riikonen<sup>1</sup>, Pertti Sarala<sup>3</sup>, Vesa-Pekka Lehto<sup>1</sup>, Bruno Lemièrè<sup>4</sup></b>  1: Dept. of Applied Physics, University of Eastern Finland, FI-70210 Kuopio, Finland; 2: 3AWater Oy, FI-70210, Kuopio, Finland; 3: Geological Survey of Finland, FI-96101 Rovaniemi,</p>	<p><b>Legacy Mine Impacts</b>  Location: Meeting Room 3  Chair: <b>Julia Dent</b></p> <hr/> <p><b>12:40pm - 1:05pm</b>  <b>Assessment of the Constraints on Sustainable Urban Drainage Systems Due to Rising Mine Water and Mine Water Management</b>  <b>Lee M Wyatt<sup>1</sup>, Ian A Watson<sup>1</sup>, Sally Gallagher<sup>2</sup>, Joanne Grantham<sup>2</sup></b>  1: Coal Authority, United Kingdom; 2: Environment Agency, United Kingdom</p> <hr/> <p><b>1:05pm - 1:30pm</b>  <b>Site Specific Optimisation Assessment Of Circum-neutral Water Treatment Using a Cost-treatability Curve Assessment</b>  <b>James Marsden<sup>1</sup>, Steven Pearce<sup>1</sup>, Tim Sambrook<sup>1</sup>, Julia Dent<sup>2</sup>, Andrew Barnes<sup>3</sup></b>  1: Cambrian Environmental Technologies Ltd., 1a Gower Street, Cardiff, Wales, CF24 4PA; 2: Mine Environment Management Ltd., 3a Vale Street, Denbigh, Wales, LL16 3AD; 3: Geochemic Ltd., Lower Race, Pontypool, Wales, NP4 5UH, United Kingdom</p> <hr/> <p><b>1:30pm - 1:55pm</b>  <b>Evaluating Circum-neutral Mine Drainage: Case Studies of Advanced Testing Methods Generating Representative Empirical Data</b>  <b>Steven Richard Pearce<sup>1</sup>, Diana Brookshaw<sup>1</sup>, Seth Mueller<sup>2</sup>, Andrew Barnes<sup>3</sup></b>  1: Mine Environment Management Ltd, United Kingdom; 2: Boliden Mineral AB, Boliden, Sweden; 3: Geochemic Ltd, United Kingdom</p> <hr/> <p><b>1:55pm - 2:20pm</b>  <b>Algae Bioaccumulation Capacity for Metals in Acid Mine Drainage (AMD)-a Case Study in Frongoch Mine, the UK</b>  <b>Tianhao Du<sup>1</sup>, Anna Bogush<sup>2</sup>, Paul Edwards<sup>3</sup>, Peter Stanley<sup>3</sup>, Luiza C Campos<sup>1</sup></b>  1: Department of Civil, Environmental</p>

Chemistry, 200 College St., Toronto, ON, Canada; 3: Stantec, 100-300 Hagey Boulevard, Waterloo, ON, Canada

Finland; 4: BRGM, France

**2:20pm - 2:45pm**

**Gravel Bed Reactors: Semi-Passive Water Treatment Of Metals and Inorganics**

**Silvia Mancini<sup>1</sup>, Rachel James<sup>1</sup>, Evan Cox<sup>1</sup>, James Rayner<sup>2</sup>**

1: Geosyntec Consultants Inc, Canada; 2: Geosyntec Consultants Ltd, United Kingdom

& Geomatic Engineering, Faculty of Engineering, University College London, London, WC1E 6BT, United Kingdom; 2: Centre for Agroecology, Water and Resilience, Coventry University, Coventry, CV8 3LG, United Kingdom; 3: Natural Resources Wales, 29 Newport Road, Cardiff CF24 0TP, United Kingdom

**2:20pm - 2:45pm**

**UNEXMIN and UNEXUP Projects: Development of Submersible Robots for Survey of Flooded Underground Mines**

**Stephen Henley**

Resources Computing International, United Kingdom

**3:00pm  
-  
5:00pm**

**Virtual Tours**

Date: Thursday, 15/July/2021

<p>8:45am - 9:40am</p>	<p>Morning Session Thursday Chair: John George Annandale</p> <p><b>Brief Notes from Two Decades of Mine Waste and Mine Water Research</b> <b>Devin Sapsford</b> Cardiff University, United Kingdom</p> <hr/> <p><b>Tba</b> <b>Christian Wolkersdorfer</b> Tshwane University of Technology (TUT), South Africa</p>		
<p>9:40am - 9:50am</p>	<p><b>Health Break</b></p>		
<p>9:50am - 11:55am</p>	<p><b>Mine Drainage Chemistry</b> Location: Meeting Room 1 Chair: Rob Bowell</p> <p>9:50am - 10:15am <b>A Comparison Of Be And W In Mine Drainage Downstream Two Different Repositories Storing Tailings From A Skarn Ore</b> <b>Lina Hällström, Lena Alakangas</b> Luleå University of Technology, Sweden</p> <p>10:15am - 10:40am <b>Alternative Reagents for the Treatment of Pb-Zn Mine Drainage in Wales</b> <b>Joe Dean, Ban Alkhazraji, Devin Sapsford</b> Cardiff University, United Kingdom</p> <p>10:40am - 11:05am <b>Dewatering, Flooding and Stratification of Nikolaus-Bader small-scale Gold Mining Shaft in Austria</b> <b>Elke Mugova<sup>1</sup>, Christian Wolkersdorfer<sup>2</sup></b> 1: Technische Hochschule Georg Agricola, Germany; 2: Department of Environmental, Water and Earth Sciences, Tshwane University of Technology, South Africa</p> <p>11:05am - 11:30am <b>Justification For Modification Of The NAG Test Method To Suit Varied Mining Waste Geochemical Characteristics On A Site-Specific Basis</b> <b>Andrew Barnes<sup>1</sup>, Steven Pearce<sup>2</sup>, Diana Brookshaw<sup>2</sup>, Mark Roberts<sup>1</sup>, Seth Mueller<sup>3</sup></b> 1: Geochemic Ltd, Lower Race, Pontypool, NP4 5UH. United Kingdom; 2: 2Mine Environmental Management Ltd, Vale Street, Denbigh, Denbighshire, LL16 3AD. United Kingdom; 3: Boliden AB, Sweden</p>	<p><b>Mine Hydrogeology</b> Location: Meeting Room 2 Chair: Catherine Hughes</p> <p>9:50am - 10:15am <b>Groundwater Source Determination of an Underground Diamond Mine Utilizing Water Chemistry and Stable Isotope Analysis</b> <b>Paul Lourens<sup>1</sup>, Adriaan Pretorius<sup>1</sup>, Danie Vermeulen<sup>2</sup></b> 1: Institute for Groundwater Studies, Faculty of Natural and Agricultural Sciences, University of the Free State; 2: Faculty of Natural and Agricultural Sciences, University of the Free State</p> <p>10:15am - 10:40am <b>Integration of Regional and Site Scale Models for an Open-Pit Mine</b> <b>John Rupp<sup>1</sup>, Geoff Beale<sup>1</sup>, Kevin Howerton<sup>2</sup>, Phillip Maxwell Allen<sup>1</sup></b> 1: Piteau Associates; 2: Round Mountain Gold Corporation</p> <p>10:40am - 11:05am <b>Looking Deeper: Key Considerations for Planning Mining Hydrogeology Investigations using Deep Boreholes</b> <b>Ed Austin<sup>1</sup>, Grace Yungwirth<sup>1</sup>, Michal Dobr<sup>2</sup>, Sofia Nazaruk<sup>1</sup></b> 1: Golder Associates (UK) Ltd; 2: Golder Associates Ltd</p> <p>11:05am - 11:30am <b>Application Of Anthropogenic Organic Contaminants For The Determination Of Water Ingress In The Witwatersrand Goldfields Mine Voids</b> <b>Lufuno Ligavha-Mbelengwa<sup>1</sup>, Godfrey Madzivire<sup>1,2</sup>, Pamela Nolakana<sup>1</sup>, Tebogo Mello<sup>1</sup>, Henk Coetzee<sup>1</sup></b> 1: Council for Geoscience, South Africa; 2: University of South Africa, South Africa</p>	<p><b>Mining Operations</b> Location: Meeting Room 3 Chair: John George Annandale</p> <p>9:50am - 10:15am <b>Comparative Life Cycle Assessment For Acid Mine Drainage Management Options In The Central Basin Of The Witwatersrand Goldfields</b> <b>Godfrey Madzivire<sup>1,2</sup>, Thakane Ntholi<sup>1</sup>, Henk Coetzee<sup>1</sup></b> 1: Council for Geoscience, South Africa; 2: University of South Africa</p> <p>10:15am - 10:40am <b>Monitoring of Water-Bearing Adits – Current Results and Perspectives</b> <b>Tobias Rudolph, Christian Melchers, Peter Goerke-Mallet, Detlef Engel</b> Technische Hochschule Georg Agricola Bochum University, Germany</p> <p>10:40am - 11:05am <b>A 3D Feflow hydrogeological Uranium underground mine Model, France</b> <b>Fabrice Compère<sup>1</sup>, Guillaume Kern<sup>2</sup>, Gaël Bellenfant<sup>1</sup></b> 1: BRGM, France; 2: ORANO, France</p> <p>11:05am - 11:30am <b>Investigating The Radiological Safety Of Uranium Ore Deposits From A Uranium Mine In Namibia</b> <b>Vaino Indongo<sup>1,2</sup>, Vera Uushona<sup>1,3</sup>, Manny Mathuthu<sup>1</sup>, Zivayi Chiguvare<sup>2</sup></b> 1: North-West University (Mafikeng), South Africa; 2: Namibia University of Science and Technology (NUST), 13 Jackson Kaujeua Street, P/Bag 13388, Windhoek, Namibia; 3: National Radiation Protection Authority of Namibia, Ministry of Health and Social Services, Harvey Street, Namibia</p>
<p>11:55am - 12:40pm</p>	<p><b>Lunch</b></p>		
<p>12:40pm -</p>	<p><b>Legacy Mine Impacts</b> Location: Meeting Room 1 Chair: Tom Williams</p>	<p><b>Mine Closure</b> Location: Meeting Room 2 Chair: Aaron Martin Lawrence Brown</p>	<p><b>Decarbonisation</b> Location: Meeting Room 3</p>

12:40pm - 1:05pm

### Using Geological Analogues And Proxies To Better Determine AMD Risk

Timothy Wright<sup>1</sup>, Steven Pearce<sup>1</sup>, Janjan Hertrijana<sup>2</sup>, Latipa Henin<sup>2</sup>, Muhammad Hidyat<sup>2</sup>

1: Mine Environment Management Ltd, United Kingdom; 2: PT Agincourt Resources, Indonesia

1:05pm - 1:30pm

### Laboratory Testing To Determine The Effectiveness Of Capping And Risk Of Long-term Metal Release From Mine Waste At The Abandoned Abbey Consols Lead-Zinc Mine, Wales, UK

Julia Dent<sup>1</sup>, Andrew Barnes<sup>2</sup>, Ben Gersten<sup>2</sup>, Mark Roberts<sup>2</sup>, Tom Williams<sup>3</sup>, Thomas Eckhardt<sup>4</sup>

1: Mine Environment Management, Vale Street, Denbigh, Denbighshire, UK, LL16 3AD; 2: Geochem Ltd, Lower Race, Pontypool, Wales UK, NP4 5UH; 3: Natural Resources Wales, Swansea University Singleton Campus; 4: WSP UK Ltd, Kings Orchard, 1 Queen Street, Bristol, BS2 0HQ, UK

1:30pm - 1:55pm

### Tracing The Water – Rock Interaction In The Ibbenbüren Mine - Towards A Reactive Transport Model For Coal Mine Drainage

Thomas Rinder<sup>1</sup>, Diego Bedoya Gonzalez<sup>1,2</sup>, Sylke Hilberg<sup>1</sup>

1: University of Salzburg, Department of Geography and Geology, Hellbrunner Str. 34, 5020 Salzburg, Austria; 2: University of Greifswald, Institute for Geography and Geology, Friedrich-Ludwig-Jahn Str. 17a, 17487 Greifswald, Germany

1:55pm - 2:20pm

### The Importance of Adequate Waste Rock Characterization: A Case Study of Unsuccessful Drainage Quality Prediction

Teemu Eemeli Karlsson<sup>1,2</sup>, Muhammad Muniruzzaman<sup>3,4</sup>, Päivi M. Kauppila<sup>1</sup>, Lena Alakangas<sup>2</sup>, Marja Lehtonen<sup>5</sup>

1: Circular Economy Solutions, Geological Survey of Finland, Neulaniementie 5, 70211 Kuopio, Finland; 2: Department of Civil, Environmental and Natural Resources Engineering, Division of Geosciences and Environmental Engineering, Luleå University of Technology, 97187 Luleå, Sweden; 3: Water Management Solutions, Geological Survey of Finland, Vuorimiehentie 5, 02151 Espoo, Finland; 4: Department of Environmental Engineering, Technical University of Denmark, Miljøvej, Building 115, 2800 Kgs. Lyngby, Denmark; 5: Circular Economy Solutions, Geological Survey of Finland, 02151 Espoo, Finland

12:40pm - 1:05pm

### Using Coal Combustion Residues for Abandoned Coal Mine Reclamation

Chin-Min Cheng<sup>1</sup>, Tarunjit Butalia<sup>1</sup>, Robert Baker<sup>1</sup>, Justin Jent<sup>2</sup>, William Wolfe<sup>1</sup>

1: The Ohio State University, United States of America; 2: American Electric Power

1:05pm - 1:30pm

### Forecasting Evolution Of Sulfide Mineral Oxidation Rates Over Decadal Time Scales

John Bradley Swenson<sup>1,2</sup>, Tamara Diedrich<sup>1</sup>

1: MineraLogic LLC, United States of America; 2: Dept. Earth & Environmental Sciences, Univ. Minnesota Duluth, USA

1:30pm - 1:55pm

### Planning And Implementation Of Environment-friendly Phasing Out Of German Hard Coal Mining Under Consideration Of Water-hazardous Organic Substances

Christoph Alexander Schabronath<sup>1</sup>, Christoph Klinger<sup>2</sup>, Joachim Loechte<sup>1</sup>

1: RAG, Germany; 2: DMT GmbH & Co. KG, Germany

1:55pm - 2:20pm

### The Influence Of Mine Water Rebound On Methane Degassing In Abandoned Coal Mines

Stefan Moellerherm, Christian Melchers

Technische Hochschule Georg Agricola, Germany

12:40pm - 1:05pm

### Beneficiation of Salts Crystallized from Lake Katwe Brine

Joseph Ddumba Lwanyaga<sup>1,2</sup>, Hillary Kasedde<sup>2</sup>, John Baptist Kirabira<sup>2</sup>, Alan Shemi<sup>3</sup>, Sehliselo Ndlovu<sup>3</sup>

1: Busitema University, Uganda; 2: Makerere University, Uganda; 3: University of Witwatersrand, South Africa

1:05pm - 1:30pm

### Potash Dump Leachates – Challenges from Environmental Regulatory Requirements and Climate Change

Anne Weber<sup>1</sup>, Antje Ulbricht<sup>2</sup>, Alexander Müller<sup>3</sup>, Astrid Gessert<sup>3</sup>, Felix Bilek<sup>2</sup>, Thomas Sommer<sup>1</sup>

1: Dresden Groundwater Research Centre e.V.; 2: GFI Groundwater Consulting Institute GmbH Dresden; 3: Lausitzer und Mitteldeutsche Bergbauverwaltungsgesellschaft mbH, Division Pottash-Spar-Ore

1:30pm - 1:55pm

### Recovery Of Cobalt And Copper From Tailings Through Enhanced Oxidation And Selective Precipitation

Mark Roberts, Nina Swain, Andrew Barnes

Geochem Ltd, United Kingdom

1:55pm - 2:20pm

### Carbonation Of Magnesium Silicate Minerals In Mine Waste: Practical Laboratory Testing Methods To Assess The Dual Opportunity For Carbon Capture And AMD Mitigation

Rhys John Savage<sup>1,2</sup>, Malvina Chmielarski<sup>1,2</sup>, Andrew Barnes<sup>1</sup>, Steven Pearce<sup>3</sup>, Mark Roberts<sup>1</sup>, Phil Renforth<sup>4</sup>, Seth Mueller<sup>5</sup>, Devin Sapsford<sup>2</sup>

1: Geochem Ltd, United Kingdom; 2: Cardiff University, United Kingdom; 3: Mine Environmental Management Ltd, United Kingdom; 4: Heriot-Watt University, United Kingdom; 5: Boliden AB, Sweden

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2:20pm

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2:50pm

Closing Ceremony