

# IMP@CT Final Conference

## 9-12 March 2020

Heartlands World Heritage Mining Site  
Redruth, Cornwall, UK



## Programme

### Speakers and Artists

Day One: Mining and comminution

Day Two: Metallurgy, minerals processing and environment

Day Three: Life Cycle Analysis, social sustainability and environment

Day Four: Resourcing the future - public sessions



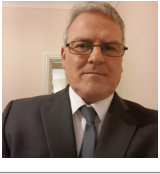



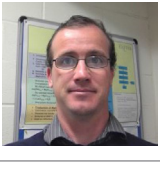

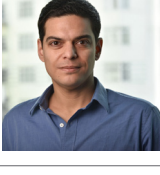

OF EARTH - FOR EARTH Exhibition open all days









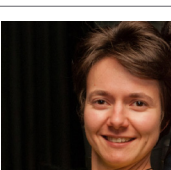




This project has received funding from the European Union's Horizon 2020 research and innovation programme. Grant no: 730411



# IMP@CT CONSORTIUM SPEAKERS

<p><b>Kathryn Moore</b> gained degree qualifications in geology (BSc), experimental petrology (PhD) and archaeology (Dip) from the University of Edinburgh, University of Bristol and National University of Ireland, Galway. She led the Magmatic Studies Group at the National University of Ireland, Galway from 1999 and moved to the Camborne School of Mines in 2012, as lecturer in Critical and Green Technology Metals. She is Expert Council Leader in HiTech AlkCarb (New Geomodels to explore deeper for High-Technology critical raw materials in Alkaline rocks and Carbonatites) and Project Lead for IMP@CT (Integrated Modular Plant and Containerised Tools for selective, low-impact mining of small, high-grade deposits). k.moore@exeter.ac.uk</p>	
<p><b>Lars Barnewold</b> is a mining engineer with a master degree from the RWTH Aachen. He is a research assistant at the Institute of Mineral Resources Engineering in Aachen and leads the work package "Project integration for business modelling" of the IMP@CT project. In his PhD thesis, he deals with the potential of digital technologies in the mining industry. barnewold@mre.rwth-aachen.de</p>	
<p><b>Gareth Thomas</b> is the Managing Director of Metal Innovations UK, with over 30 years experience in equipment design, manufacture, open cut mining and underground mining, starting in 1981. 1991 he founded SL Engineering Ltd, and designed the first hydraulic walls in the world for Brent Walker at the Cardiff International Arena, now known as the Motor Point Arena. These were displayed in operation to HM the Queen when she opened the arena in 1993. He has designed mines, river dredges, excavators and many more, and has travelled overseas, exporting skills and equipment. "It has been my life's ambition to bring work home to Wales and the UK, to at least play a part in providing work and income for the communities I grew up in". gareth@metalinnovations.co.uk</p>	
<p><b>Keiran Doyle</b> is a PhD student based at CSM with the University of Exeter, carrying out a research project investigating the safety and sustainability of small-scale, high-grade mining operations as part of the IMP@CT Project. The objective is to assess the particular risks and hazards associated with small-scale, low-impact mining on site personnel and local populations, and provide a novel approach to management of health and safety, social and environmental impacts in order to improve sustainability and responsibility in extractive operations. In addition to his PhD studies, Keiran is a Research Associate with Satarla, and is also a fellow of the Geological Society of London (FGS). kd408@exeter.ac.uk</p>	
<p><b>Luke Palmer</b> completed his under undergraduate studies at the University of Bristol with a BSc in Archaeological Sciences which included a wide range of archaeological, anthropological and geological subjects. He subsequently undertook an MSc in Mining Geology at the Camborne School of mines with a thesis on different simulation techniques applied lithological modelling at the Rossing Uranium Mine, Namibia. After finishing the MSc a short internship focusing on mineral processing was completed with Imerys Minerals Ltd in Cornwall. This led to working as an Associate Research Fellow on the EU FP7 funded Sustainable Technologies for Calcined Industrial Minerals in Europe (STOICISM) project at CSM for over three years with Imerys as the project lead. Following this EU project, he started worked as a Postdoctoral Research Fellow on the IMP@CT H2020 EU project. l.w.palmer@exeter.ac.uk</p>	
<p><b>Frédéric Goettmann</b> holds an engineer's degree from the Ecole polytechnique (France) and a PhD in Material Chemistry from the University Pierre et Marie Curie in Paris (France). After a post-doctoral stay at the Max Planck Institute for Colloids and Interfaces in Potsdam (Germany), he joined the French Atomic Energy Council (CEA). There, he mainly worked on the development of decontamination processes for nuclear waste. Basing on this experience, Frederic co-founded Extractive in 2015 in order to design and industrialise innovative processes dedicated to the recycling of industrial waste. Frédéric co-authored 45 scientific papers and 20 patents. www.extractive.com frederic.goettmann@extractive.eu</p>	
<p><b>Rob Fitzpatrick</b> is a lecturer in Mineral Processing within the Camborne School of Mines, College of Engineering, Mathematics and Physical Sciences. He received his BEng(Hons) in Mining Engineering from the University of Exeter (2004) and was awarded a PhD in Earth Resources from the same institute. Professional Qualifications: Professional Graduate Institute of Materials, Minerals and Mining (ProfGradIMMM) Fellow of the Higher Education Academy (FHEA) r.s.fitzpatrick@exeter.ac.uk</p>	
<p><b>Dana Finch</b> has worked as a project manager on several European funded projects since 2006, at Imperial College London and King's College London before moving to the University of Exeter to become the project manager of the IMP@CT Project. She is also a practising artist and has been involved in organising the Of Earth - For Earth exhibition. d.finch3@exeter.ac.uk www.danafinch.co.uk @danafinch1</p>	
<p><b>Pablo Brito-Parada</b> received his bachelor's degree in Chemical Engineering from the University of Yucatan, Mexico. He worked as a Process Engineer in the oil and gas sector before moving to the UK, where he completed his PhD in mineral processing and fluid dynamics at the Royal School of Mines, Imperial College London. He is a Senior Lecturer at Imperial's Department of Earth Science and Engineering, where his research combines novel experiments and numerical modelling for the evaluation and design of mineral processing equipment. He is an expert in the modelling of pulp and froth phase flotation phenomena and the development of techniques to optimise these systems, from bench to industrial scale. Pablo is an Editor for Elsevier's Minerals Engineering and an elected member of the International Mineral Processing Council. p.brito-parada@imperial.ac.uk</p>	
<p><b>Juliana Segura-Salazar</b> obtained her bachelor's degree in Chemical Engineering in 2008 from the School of Chemical Engineering at Universidad del Valle (Colombia). She holds a Master of Science degree in Metallurgical Engineering from Universidade Federal do Rio de Janeiro, where she also started her doctoral studies in 2014. Her PhD work focuses on aspects of sustainability in the minerals industry explored through process simulation and the use of methodologies such as Life Cycle Assessment. In 2019 she started working with Dr Pablo Brito-Parada as Research Assistant in the Advanced Mineral Processing Research Group at Imperial College London. She is contributing to the development of a modelling framework for modular, containerised small-scale mining at the Balkans, as part of the EU Horizon 2020 programme's IMP@CT Project. j.segura-salazar@imperial.ac.uk</p>	

<p><b>Jérôme Bodin</b> graduated as a geological engineer from both Ecole Nationale Supérieure de Géologie, ENSG, (Nancy, France) and University of Lorraine (Nancy, France) in 2013. Experienced in beneficiation of industrial minerals, he worked for 3 years as a consultant engineer. In June 2016 he joined BRGM, the French geological survey (Orléans, France) within the Waste and Raw Materials unit whose R&amp;D activities turn towards the efficient management of mineral resources in a Circular Economy context. He has been involved in European R&amp;D projects such as ECOMETALS, INTMET, FAME and IMP@CT. He carries out work on mineral processing simulation, as well as experimental work upon selective fragmentation and beneficiation of minerals applied to low grade and complex polymetallic ores, concrete wastes and mining wastes. <a href="mailto:j.bodin@brgm.fr">j.bodin@brgm.fr</a> <a href="http://www.brgm.fr">www.brgm.fr</a></p>	
<p><b>Vanessa Amaral Oliveira</b> obtained her PhD in Materials Science and Engineering from the Grenoble Institute of Technology (France) in 2016. During her thesis, she worked in a collaborative work between the French Atomic Energy Commission (CEA) and ECM Greentech on the optimisation of a new crystal growth method of silicon for photovoltaic applications. At Extractive, she is in charge of the international development of the company.</p> <p><a href="mailto:vanessa.amaral@extractive.eu">vanessa.amaral@extractive.eu</a></p>	
<p><b>Dominic Roberts</b> has been working in the Balkans' mining sector for 13 years. As Mineco's Chief Operating Officer he is responsible for the deployment of new projects, opening the Olovo cerussite mine in 2018 and the optimisation of the group's four operating base metal mines in Serbia and Bosnia. After studying geology at Bristol University Dominic joined the British Army, deploying on operations across the globe including tours in both Bosnia and Kosovo. Following a policy secondment to the Cabinet Office in London and a command tour in Iraq, Dominic left service in 2007. He completed the first commercial waste retreatment project in the region (ferro-chrome slag) after which he joined the Mineco team in 2013. Believing in both the potential and the absolute future requirement for European metal mining Dominic was a founding initiator of the European Union funded IMP@CT project in 2017 committing to identify faster and more efficient ways of bringing smaller deposits into production. <a href="mailto:rod@minecogroup.com">rod@minecogroup.com</a></p>	
<p><b>Anshul Paneri</b> joined the University of Exeter's Renewable Energy department as a Postdoctoral Research Associate in 2018. His research focuses on the feasibility study of renewable energy systems (RES) for the IMP@CT project, where he has simulated several models of hybrid RES for small complex deposits in Europe. The overall finding shows that it is technically and financially feasible to use existing RES for the IMP@CT project energy demand with significant reductions in GHG emissions compared with conventional diesel generators.</p> <p><a href="mailto:a.paneri@exeter.ac.uk">a.paneri@exeter.ac.uk</a></p>	
<p><b>Patrick Foster</b> is the Director of Education and Associate Professor in Mine Safety at the Camborne School of Mines where he lectures and undertakes research into the health, safety and working environment aspects of mining and quarrying. His particular research interests are in safety management systems, human factors, risk management, surveying and underground communications. He graduated in Mining Engineering from the University of Nottingham and continued there to undertake a PhD looking into safety risk assessment in the mining industry supported by British Coal. He then joined International Mining Consultants Ltd as a Mine Safety Consultant where he was involved in health &amp; safety management system audits, risk assessment training and research in the UK, India and South Africa. <a href="mailto:p.j.foster@exeter.ac.uk">p.j.foster@exeter.ac.uk</a></p>	
<p><b>Mikko Syväne</b> has more than 25 years of experience in EU and other public funding as well as project operations. Mikko has also been a member of the board of International Centre for Environmental Services Governance Research (ICES) since 2006.</p> <p><a href="mailto:mikko.syvanne@epse.fi">mikko.syvanne@epse.fi</a></p>	
<p><b>Marjan Knobloch</b> Presently, Marjan is a PhD Student and Research Assistant at the Institute of Mineral Resources Engineering, RWTH Aachen University (Germany). She gained a M.Sc. in Applied Geosciences from the Martin-Luther-University Halle-Wittenberg (Germany) in 2016, having conducted research on the weathering of sulphidic black shales and the prediction of metalliferous waters. Her current PhD research work concerns the development of predictive testing methods for mine water quality regardless of pH conditions.</p> <p><a href="mailto:knobloch@mre.rwth-aachen.de">knobloch@mre.rwth-aachen.de</a></p>	
<p><b>Olga Sidorenko</b> holds her Master's degree in Environmental Policy and Law from University of Eastern Finland. Her areas of focus include social scientific research on extractive industries, company-community relations and sustainability challenges of mining development. In the IMP@CT project, Olga has worked on local community perspectives and factors of social acceptance of small-scale mining. Her previous work in the University of Eastern Finland examines the challenges of sustainable mining governance in post-socialist countries.</p> <p><a href="mailto:olga.sidorenko@uef.fi">olga.sidorenko@uef.fi</a></p>	
<p><b>Stéphanie Muller</b> holds a Ph.D in Life cycle assessment (LCA) from Polytechnique Montreal where she specialized in uncertainties quantification in LCA. At BRGM since October 2016, she has been assessing the environmental impacts of raw materials production and consumption as well as their fluxes in the economy. For that, she mobilizes tools such as life cycle assessment, material flows assessment or MRIO assessment. She takes part in various European (H2020, EIT KIK RM) and national projects on the topic of raw materials production and circular economy.</p> <p><a href="mailto:s.muller@brgm.fr">s.muller@brgm.fr</a></p>	
<p><b>Xiaoyu Yan</b> is a Senior Lecturer in Energy and Environment at the University of Exeter and was previously a Research Associate at the Universities of Cambridge, Oxford and London, with a PhD in Mechanical Engineering. Xiaoyu has a broad interest in water, energy, food and the environment and over 15 years of experience in using life cycle assessment (LCA) as a key method to assess the sustainability of technologies in a wide range of sectors including energy, transport, water, food, raw materials and waste. His current research is highly interdisciplinary and focuses on the development of quantitative analytical models and tools to help governments, industry and the public make more informed decisions with respect to environmental sustainability. <a href="mailto:xiaoyu.yan@exeter.ac.uk">xiaoyu.yan@exeter.ac.uk</a></p>	
<p><b>Rauno Sairinen</b> works as a professor of environmental policy at the University of Eastern Finland and as a scientific leader of the Institute for Natural Resources, Environment and Society. His major research themes have concerned mining policies and its social responsibility, environmental and natural resources governance, social impact assessment, environmental policy instruments and community planning. He is a member of the Board of Directors at the Geological Survey of Finland (GTK) and has been appointed as Honorary Professor in the Centre for Social Responsibility in Mining (CSRMI) at the University of Queensland in Australia. Currently he is responsible WP leader in the EU's Horizon2020 IMP@CT project (<a href="http://www.uef.fi/web/serm/impact">www.uef.fi/web/serm/impact</a>) and Finland's Strategic Research Funding's Core -project (<a href="http://www.collaboration.fi">http://www.collaboration.fi</a>).</p> <p><a href="mailto:rauno.sairinen@uef.fi">rauno.sairinen@uef.fi</a></p>	

# Programme

Time	Day One Monday 9th March	Time	Day Two Tuesday 10th March
08:30-09:10	Registration	08:30-09:10	Registration
09:15-10:45	Session One: Small-scale mining	09:10-10:45	Session One: Metallurgy and minerals processing
09:15	Kathryn Moore: Welcome and introduction to the IMP@CT Project	09:10	Pablo Brito-Parada: Mineral processing simulators: State-of-the-art and future challenges
09:45	Pamela Lesser: Perceptions and values: why SLO is different in Europe	09:30	Juliana Salazar and Jérôme Bodin: Accounting for the effect of ore and process variability on the metallurgical performance of the modular, containerised IMPaCT pilot plant: Olovo Case Study
10:05	Dylan McFarlane: Responsible Small-Scale Mining: Achieving the SDGs	09:55	Vanessa Amaral: Towards a switch-on/switch-off process for the recovery of antimony oxide from stibnite-rich ore
10:25	Dominika Glogowski: The Arts - Embodying Dialogue for Socio-Ecological Transformation in Extractivism	10:15	Jérôme Bodin: Legacy deposits: can small-scale mining paradigm contribute to re-process mining wastes to supply critical raw materials?
		10:35	Kagya Nyanin: Scandium Aluminum in EU project SCALE
10.45 - 11.15	Tea and coffee break	10:55-11:25	Tea and coffee break
11.15 - 12:50	Session Two: Underground	11:25-12:50	Session Two: Constructing mobile plant
11:15	Lars Barnewold: From planning to integration - simulation of a flexible mining method for small-scale mining operations	11:25	Rob Fitzpatrick: Overview logistics for rapid deployment
11:35	Gareth Thomas: A selective mining tool to replace primary crushing	11:45	Dominic Roberts: Decision-making in small-scale mines
11:55	Jack Hirons: Mining Stickers for 2020 and beyond - borrowing the visual identity of mining stickers to reflect on our relationship with material	12:05	Anshul Paneri: Renewable energy in small-scale mining
12:15	Keiran Doyle: Health & safety best practice in small-scale, low-impact SOSO mining operations	12:25	Pat Foster: Health and safety by design
12:45-13:40	LUNCH	12:45-13:40	LUNCH
13:40-15:10	Session Three: Sorting and comminution	13:40-15:20	Session Three: Prediction and mitigation of environmental impacts
13:40	Luke Palmer: Small scale milling for Switch-On Switch-Off mining: Innovative comminution and traditional technology	13:40	Edvard Glucksman: Circular economy in mining (TEVI case studies)
14:00	Frédéric Goettmann: Down-sizing a comminution facility	14:00	Mikko Syväne: Mobile EPSE solutions to Acid Mine Drainage
14:20	Rob Fitzpatrick: Ore sorting for small-scale mining	14:20	Marjan Knobloch: Visualisation of sulphide oxidation
14:40	Klaas Peter van der Wielen: Simulation of the influence of different modes of selective liberation on metallurgical performance	14:40	Olga Sidorenko/ Keiran Doyle: Applying culture maturity principles for management of socio-environmental impacts in small-scale, low-impact mining
15:00	Dana Finch: Introduction to the OEFE exhibition	15:00	John Vine: Landscape remediation
15:10-15:30	Tea and coffee break	15:20-15:50	Tea and coffee break
15:30-17:00	Session Four: Break-out discussions	15:50-17:30	Session Four: Break-out discussions
17:00-18:30	OF EARTH - FOR EARTH Reception and Private View	19:30	Conference dinner at Tregenna Castle Hotel, St Ives

# Programme

Time	Day Three Wednesday 11th March	Time	Day Four Thursday 12th March
08:30-09:10	Registration	08:30-09:10	Registration
09:15-10:40	Session One: Life Cycle Analysis and Integration	09:15-10:45	Session One: Metallurgy and minerals processing
09:15	Jérôme Bodin: Towards a LCA tool to forecast the environmental impacts of mining	09:15	Frances Wall: Mining as the foundation of modern society
09:35	Stéphanie Muller: Challenges regarding sLCA applied in the case of small-scale mining	09:35	Dylan McFarlane: Mining in the media
09:55	Xiaoyu Yan: Life Cycle Analysis for renewable energy	09:55	Tommi Kauppila: What is sustainability?
10:15	Robert Pell: Life Cycle Analysis for critical raw materials	10:15-10:45	TASK: Picturing the material future 1
10.35 - 11.05	Tea and coffee break	10:45-11:15	Tea and coffee break
11.05 - 12:45	Session Two: Societal framings and community legacy	11:15-12:50	Session Two: The climate emergency and mining innovation
11:05	Olga Sidorenko: Exploring limited societal impacts of small-scale mining - a case-study from the Balkans	11:15	Kate Littler: Global warming and the point of no return
11:25	Rauno Sairinen: Policy for small-scale mining	11:35	Kate Moore: The green energy transition and critical raw materials
11:45	Bridget Storrie: Ore and Peace - bringing natural-resource related peacebuilding down to Earth.	11:55	Rich Crane: Mining innovation
12:05	Nic Bilham: Geology for Global Development	12:15 - 12:45	TASK: Picturing the material future 2
12:25	Henrietta Simson: Transformative Wilderness - from medieval cave to industrial mine; from landscape image to landscape site		
12:45-13:40	LUNCH	12:45-13:40	LUNCH
13:40-15:20	Session Three: Dealing with waste, degradation and voids	13:40-15:20	Session Three: Dialogues for the next generation of miners
13:40	Penda Diallo: Sustainable mining and the challenge of managing waste/degradation - personal perspectives from West Africa	13:40	Adele Rouleau: Creative solutions for contentious issues
14:00	Karen Hudson-Edwards: Mine Tailings - environmental impacts and resource futures	14:00	Rauno Sairinen: SLO and community cooperation
14:20	Richard Elmer: Filtered tailings for small-scale mines	14:20	Julian Allwood: Absolute Zero emissions and the future of material sourcing
14:40	Carlos Petter: The environmental cost of mining	14:40	TASK: Picturing the material future 3
15:00	Heidi Flaxman: Sculpted landscapes - sustainable futures of landscape and craft	15:00	Closing remarks and END
15:20-15:45	Tea and coffee break	15:20-15:50	Tea and coffee break
15:45-17:15	Session Four: Break-out discussions		DEPARTURE

# EXTERNAL SPEAKERS

**Pamela Lesser** is a researcher within the Arctic Governance Research Group at the Arctic Centre, University of Lapland, where she focuses on sustainable mining practices, and in particular, the social license to operate (SLO) concept. As part of a Horizon 2020 project on EU mining regions (MIREU), she is currently leading the effort that will result in European Union SLO Guidelines and a SLO Toolkit

Pamela Lesser was educated at Georgetown University, the University of California, Los Angeles (B.A., Political Science, M.A., Urban Planning), and conducted post-graduate studies in environmental policy at the RAND Corporation and in environmental science and policy at Johns Hopkins University in Washington, DC. [pamela.lesser@ulapland.fi](mailto:pamela.lesser@ulapland.fi)



**Dylan McFarlane** is a mining engineer with a professional career developing and operating small-scale gold mines spanning 14 years. His technical expertise includes geological exploration, mineral processing, mine reclamation, and tailings/waste management. He worked with Anglo American on their proposed Pebble gold-copper mine project in Alaska and at Los Bronces copper mine in Chile. He has a MSc in Mining Engineering from the Camborne School of Mines (CSM), and a MA in Sustainable Development from the University of St. Andrews. Dylan was project manager for the EU-funded HiTech AlkCarb research project and involved in teaching and research. [dmcfarlane@pactworld.org](mailto:dmcfarlane@pactworld.org)



**Dominika Glogowski** is founder of the interdisciplinary think tank artEC/Oindustry in 2012, tackles the arts as a communication platform between the mining industry, nature and communities for a sustainable and participatory socio-ecological future in extractive areas. With a professional background in Arts Management, Art History, and Visual Arts, Dominika has gained a strong international expertise in revitalization processes and the collaboration between science, technology and the arts and architecture. Her interests focus on bridging gaps between theoretical and applied practices, fostering humanities in STEM and life sciences, and communicating socio-ecological economic interconnectedness through the experience of art. [www.artecoindustry.com](http://www.artecoindustry.com) [office@artecoindustry.com](mailto:office@artecoindustry.com) [@artecoindustry](https://facebook.com/artECOindustry)



**Klaas Peter van der Wielen** has a multidisciplinary background, having done a BSc. in Geology at the university of Utrecht (Netherlands), an MSc. in Mining Engineering from the Technical University of Delft (also Netherlands) and a PhD in Mineral Processing from the Camborne School of Mines, UK. Following completion of his degrees he worked as a mineral processing engineer at SelFrag AG, assisting development of their high voltage comminution technology followed by several years at Wolf Minerals as a shift metallurgist during commissioning and operation of their Hemerdon WO3/Sn mine, and currently as senior metallurgist at metallurgical consultancy Grinding Solutions. [klaas.vanderwielen@grindingsolutions.com](mailto:klaas.vanderwielen@grindingsolutions.com)



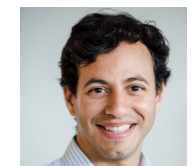
**John Vine** was born and raised in Cornwall, John has worked in the china clay (kaolin) and ball clay industry, within the United Kingdom, for over 40 years. A Fellow of the Institute of Quarrying, for the last 15 years he has held responsibility for the provision of a comprehensive mineral planning service to Imerys' UK sites covering all aspects of mineral extraction, waste disposal, restoration and land remediation. He has overseen the implementation of landscape scale restoration projects in the St Austell China Clay area including the creation of low-land heathland and over 400 hectares of native broadleaved woodland. More recently John has worked with colleagues in Academia, Statutory Bodies and the Waste Industry developing techniques to allow the use of organic waste materials as soils forming materials for use in Imerys' ongoing restoration programme. [john.vine@imerys.com](mailto:john.vine@imerys.com)



**Kagya Nyanin** Technical Manager at LCM. He is responsible for management of the European project portfolio as well as process improvement and new product development. Prior to joining LCM, Kagya worked in technical and quality management roles at Tata Steel UK for 9 years. Kagya holds BSc (Hons) in Metallurgical Engineering and MRes in Materials in Engineering. Less Common Metals Ltd is a world leader in the manufacture and supply of complex alloy systems and metals and are specialists in those based on rare earth elements. For instance, LCM produces Neodymium-Boron-Iron and Samarium-Cobalt alloys for the permanent magnet industry, supplied in powder, strip cast flake or cast ingot forms. LCM is partner in EU funded projects, SCALE, SeCREEts, 3DREMAG, UPGRADE and SUSMAGPRO. Previous partners in EU Projects: REE4EU, ReCOVER, and EuRARE [kagya.nyanin@lesscommonmetals.com](mailto:kagya.nyanin@lesscommonmetals.com)



**Edvard Glucksman** is a sustainability practitioner working for the University of Exeter, serving as the business-facing manager on Tevi, an ERDF-funded programme supporting SMEs in Cornwall to grow whilst contributing to the circular economy and environmental growth. He recently spent three years as a senior environmental consultant with Wardell Armstrong, specialising in the environmental and social impacts of development projects in emerging economies in line with the standards of international financial institutions, with a focus on the mining industry. He has previously held a number of roles at the interface of science and society, having worked at the European Geosciences Union and the UK Parliamentary Office of Science and Technology. Edvard holds MSc and PhD degrees from the University of Oxford and undergraduate degrees from the University of St Andrews and McGill University. [e.glucksman@exeter.ac.uk](mailto:e.glucksman@exeter.ac.uk)



**Robert Pell** is Director of Minviro, a spin-out company from University of Exeter. Minviro supports mining companies in adopting life cycle assessment approaches for their projects, highlighting environmental impacts and opportunities for improvements during the development stages of critical metal projects. Robert completed his PhD at Camborne School of Mines (University of Exeter) as part of the NERC funded SoSRare project on the topic 'responsible sourcing of rare earth elements'. During this project, novel life cycle assessment approaches were developed and applied to rare earth projects in the prefeasibility stage of development. A unique method to apply life cycle assessment to mine planning was also developed and these technologies have been further refined and applied in commercial settings. [rp416@exeter.ac.uk](mailto:rp416@exeter.ac.uk)



**Bridget Storrie** is a PhD candidate at the Institute of Global Prosperity at UCL, supervised by Professor Dame Henrietta Moore. Her research focus is the relationship between natural resources, conflict and peace. She has an MA in Russian (St Andrews University), a Masters in Peacebuilding and Reconciliation (Distinction) from Winchester University and is a trained mediator (Justice Institute of British Columbia).







Bridget worked as a foreign news producer for ITN in Moscow in the early 1990s. She is married to a mining engineer and has lived and worked in Namibia, Alaska, Australia, Canada, Mongolia and Serbia.

[bridgetstorrie@me.com](mailto:bridgetstorrie@me.com)



<p><b>Nic Bilham</b> is a researcher at the University of Exeter, where he is working on responsible sourcing of minerals, the relationship between mining and the circular economy, and the challenge of assuring environmental and social impact standards across complex value chains and production-consumption networks. Until 2018, he worked at the Geological Society of London for over 20 years, most recently as Director of Policy and Communications. He has a longstanding interest in interdisciplinary approaches to global societal challenges relating to meeting our resource needs sustainably. Nic is chair of trustees of Geology for Global Development (GfGD), and an Executive Council member of the International Association for Promoting Geoethics (IAPG). He holds degrees in History and Philosophy of Science (BA, University of Cambridge) and Science and Technology Policy (MSc, University of Sussex). <a href="mailto:nb533@exeter.ac.uk">nb533@exeter.ac.uk</a></p>	
<p><b>Penda Diallo</b> Before joining CSM, Penda was Senior Resilience Advisor at CARE International-UK, providing technical support and project development assistance on resilience building projects in various CARE country programmes including Niger, Nepal, Somaliland, South Sudan, and Haiti. Before joining CARE she was a livelihoods and governance advisor, where she worked on natural resource management projects in Burkina Faso, Sierra Leone, Guinea and Cameroon. Previously she had worked as an environmental consultant for AECOM, and in research and communications roles for the Conflict, Security and Development Group in King's College London, Helen Keller Worldwide in Guinea. She has recently published a book on her research into bauxite mining, Regime Stability, Social Insecurity and Bauxite Mining in Guinea available from the university library and online from : <a href="https://www.routledge.com/Regime-Stability-Social-Insecurity-and-Bauxite-Mining-in-Guinea-Developments/Diallo/p/book/9780367252113">https://www.routledge.com/Regime-Stability-Social-Insecurity-and-Bauxite-Mining-in-Guinea-Developments/Diallo/p/book/9780367252113</a> p.n.diallo@exeter.ac.uk</p>	
<p><b>Karen Hudson-Edwards</b> is Professor of Sustainable Mining at the Camborne School of Mines and Environment and Sustainability Institute, University of Exeter. Her major interests are the environmental impacts of mining and promoting sustainable mining practices. Her group carries out research to characterise mine wastes (including tailings), environmental minerals, waters and dusts, develop remediation and mitigation schemes for mine wastes, and determine the global biogeochemical and health impacts of mining. Her group's research is interdisciplinary, covering the fields of environmental geochemistry and mineralogy, physical and human geography, microbiology, chemistry, archaeology, engineering and law, and has been conducted all over the world. Karen was the recipient of the 2019 European Association of Geochemistry's Distinguished Lecturer award. <a href="mailto:k.hudson-edwards@exeter.ac.uk">k.hudson-edwards@exeter.ac.uk</a></p>	
<p><b>Richard Elmer</b> is a Chartered Engineer, Member of the IoM3 and Director of Knight Piésold Limited in the UK. Richard is a geotechnical specialist with over 30 years of experience. Educated at Southampton University (BSc Geology) and Camborne School of Mines (MSc Mining Geology), Richard has worked on projects in Eastern and Western Europe; North and South America; Northern, Sub-Saharan, and Southern Africa; Russia; Central Asia; and Asia Pacific. He is responsible for a significant portfolio of mine waste facility reviews and audits undertaken from the London office globally, and regularly presents on mine waste and tailings management best practice at industry seminars and conferences. Richard co-established the Knight Piésold London office in 2013 and has built a practice of dedicated geotechnical, civil engineering and tailings professionals that have worked on over 50 mines in 30 countries in the last six years, with a focus on tailings and rock mechanics. <a href="mailto:relmer@knightpiesold.com">relmer@knightpiesold.com</a></p>	
<p><b>Carlos Petter</b> has a Bachelor's degree in Mining Engineering from the Federal University of Rio Grande do Sul, Brazil (1986), and has a PhD in Techniques et Économie de L'Entreprise Minière by École des Mines de Paris (1994). He was a post-doc at École des Mines d'Alès (2002), in mineral fillers on polymers, and the University of Exeter (2018) in Mining and Sustainability. Currently he is Professor at UFRGS. He has experience in mining engineering, with an emphasis on Economic Evaluation, and experience in projects with companies in the mining and industrial minerals sector (Vale, Imerys, PPG, Renner-Herrmann, Braskem). He has 50 publications in journals and 50 publications in congress proceedings. <a href="mailto:cpetter@ufrgs.br">cpetter@ufrgs.br</a></p>	
<p><b>Frances Wall</b> is Professor of Applied Mineralogy, and an expert in critical metals and responsible mining research. Her background is in carbonatites and their ore deposits including, especially now, critical metals, working first at the Natural History Museum, London and then at Camborne School of Mines where she held the role of Director for a time. She was part of the Natural Environment Research Council Expert group for the Mineral Resources Programme on Security of Supply of Minerals (2011-13) and currently leads a number of large research projects with Universities, geological surveys and exploration companies. In 2019 she was awarded the Geological Society of London's William Smith Medal, the first ever female recipient. <a href="mailto:f.wall@exeter.ac.uk">f.wall@exeter.ac.uk</a></p>	
<p><b>Tommi Kauppila</b> obtained both his MSc (1995) and PhD (2003) in geology from the University of Turku, Finland. He has worked at the Geological Survey of Finland (GTK) since 2001, first as a visiting scientist, then Senior Scientist, and Principal Scientist. Since 2016 Tommi works as Research Professor of Mine and Industrial Environments at GTK. His research interests include environmental risk assessment methods for mining operations, surface water impacts of mining, and sustainable mining issues. <a href="mailto:tommi.kauppila@gtk.fi">tommi.kauppila@gtk.fi</a></p>	
<p><b>Kate Littler</b> is a Senior Lecturer in Geology at the Camborne School of Mines. Her research focuses on reconstructing climate and environmental change in Earth's deep past, through detailed sedimentological, palaeontological, and geochemical analyses of marine sediments. This increased understanding of the biological response to ancient climate change can inform our understanding of the resilience of modern ecosystems and biogeochemical cycles to ongoing anthropogenic climate change. <a href="mailto:k.littler@exeter.ac.uk">k.littler@exeter.ac.uk</a></p>	
<p><b>Rich Crane</b> is a Lecturer in Sustainable Mining at the Camborne School of Mines and the Environment and Sustainability Institute, University of Exeter. Rich has a BSc in Environmental Geoscience and PhD in Geochemistry from the University of Bristol. His research focuses on the development of novel methods to dissolve and recover metals from ores and waste materials. <a href="mailto:r.crane@exeter.ac.uk">r.crane@exeter.ac.uk</a> Twitter: RichCraneGeo Web: <a href="https://emps.exeter.ac.uk/csm/staff/rc537">https://emps.exeter.ac.uk/csm/staff/rc537</a></p>	
<p><b>Julian Allwood</b> is lead author of the recent UK Fires report Absolute Zero, Professor Allwood's work focuses on material efficiency as a climate mitigation strategy, as well as whole-system analysis of natural resource systems. Professor of Engineering and the Environment at Cambridge University and author of the 2012 book "Sustainable Materials: with both eyes open", his research group investigates material demand reduction, novel material saving manufacturing processes and whole-system analysis of energy, land, water and material resource systems. Prof. Allwood is also Director of the UK Fires group on industrial resource efficiency, whose recent Absolute Zero report has been making waves in the policy sphere. Professor Julian Allwood FREng Professor of Engineering and the Environment, Cambridge University &amp; Director, UK Fires <a href="mailto:jma42@cam.ac.uk">jma42@cam.ac.uk</a></p>	

# ARTISTS

<p><b>Heidi Flaxman</b> is a mixed media artist using traditional craft processes and digital fabrication methods. Her practice investigates intangible landscape; through craft she transforms vast areas into tangible artefacts which encourages alternative visual exploration of an area.</p> <p>“Through my creative practice I present an alternative view on a landscape through the coalescence of physical geographies and microscopic geologies which are largely unseen. Exposure of these elements is used to enhance a narrative of the landscape, its features and histories. Post-industrial landscapes, where topography has been altered as a result of the exploitation are inspiration for my work”.</p> <p>heidi@heidiflaxman.co.uk</p>	
<p><b>James Hankey</b> is an artist based in the South West, and has exhibited widely across the UK. His practice develops through photographic, performative and often absurdist processes of production that reflect on and conflate local histories and wider ecologies.</p> <p>jameshankey84@gmail.com</p>	
<p><b>Jack Hirons</b> lives and works in London. Jack studied BA (hons) Photographic Arts at the University of Westminster. Previous exhibitions include Bone Black, Backroom Gallery, London (2019); All or Nothing, Lungley Gallery, London (2019); Material Light, Kochi Biennale, India (2017); Material Light, Kulturni Centar Beograda, Serbia (2015)</p> <p>hironsjm@gmail.com</p>	
<p><b>Josie Purcell</b> Based in Cornwall, Josie Purcell’s photographic practice predominantly looks at the human impact on the natural world through the use of alternative and camera-less photographic processes. She set up her participatory photography project, ShutterPod, in 2014, and gained a distinction in her MA in Photography in 2019. Josie has exhibited internationally with organisations such as Shutter Hub and with Rome Art Week.</p> <p>jepurcell@btinternet.com</p>	
<p><b>Dan Pyne</b> was born in London, and studied Scientific Illustration at Middlesex University. Since 2010 he has lived and worked in Cornwall teaching on workshops and projects across the county including at Tate St Ives. He currently works at the Newlyn School of Art and is a recent Vice-Chair of the Newlyn Society of Artists.</p> <p>His practice is principally an exploration of materials and experiments in process that teeter between structure, control and self creating organic objects. The works often inhabit a space between sculpture, installation and painting, shaped as much for their haptic qualities as the visual.</p> <p>danny.pyne@btinternet.com</p>	
<p><b>Henrietta Simson</b> is an artist whose work explores the landscape image through its historical and cultural development, and its current definition within a digital context framed by ecological crisis. Drawing from late medieval and early Renaissance imagery, she presents an idea of landscape that challenges its designation within human/nonhuman dichotomies and that facilitates a critical questioning of the visual structuring of space. She completed an MA at the Slade School of Fine Art in 2007, and a practice-related PhD in 2017: Landscape After Landscape, Pre-Genre Backgrounds in a Post-Genre Digital Age.</p> <p>henriettasimson@yahoo.co.uk</p>	

Artists' workshops	Thursday 12th March		
Dan Pyne	Drypoint Printmaking on theme of sustainable mining and consumption of Earth's materials	Copper Room	10:00 - 12:00
Josie Purcell	Lumen walk and talk workshop -using mobile phones to create images	Copper Room and various locations on site	14:00 - 16:00

