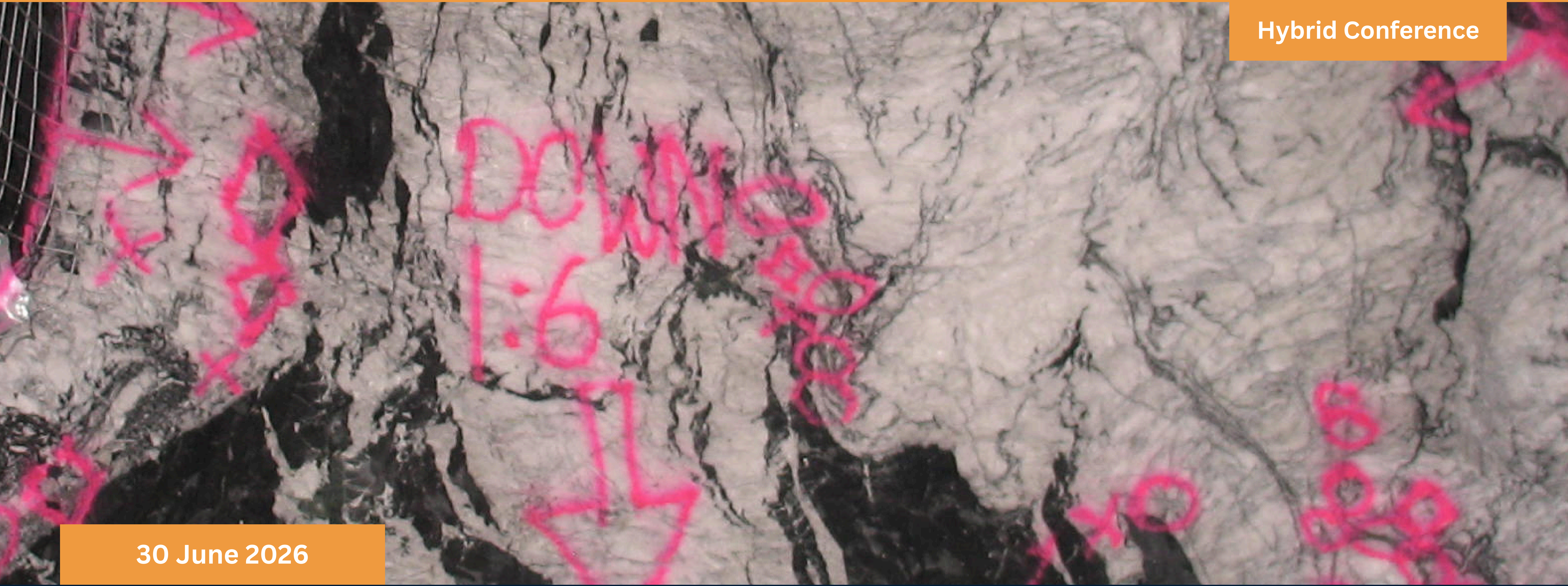

Hybrid Conference

30 June 2026

Mineral Resource Evalaution 2026

CONFERENCE PROGRAMME

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Tuesday 30 June	
0915 - 1000	Registration opens, tea & coffee
1000 - 1010	**Welcome address** Dr Simon Dominy, *Camborne School of Mines*
Session One *Chaired by Hylke Glass, Camborne School of Mines*	
1010 - 1035	**The depletion trap: why we must rethink the resource development pipeline** Dr. Alastair Cornah, *Anglo American*
1035 - 1100	**Understanding sources of risk in mineral reserves** Prof. Julian Ortiz, *Camborne School of Mines* Reliable mineral reserve estimates are central to mine planning, but they are inevitably uncertain due to limited sampling and an incomplete understanding of the geological controls of the distribution of different ore properties. In practice, mineral resources are commonly estimated using kriging, producing a smoothed representation of grade that is subsequently converted into mineral reserves through optimization processes based on economic and operational constraints. However, discrepancies always emerge between predicted and actual production outcomes during operation, raising questions about the causes of these departures. In this presentation, a procedure to model the different sources of uncertainty is provided along with an approach to translate this uncertainty into risk (related to recovered metal), thus identifying the relevance of each source of uncertainty in the risk profile of the project. First, we use geostatistical simulations to create possible renditions of the ore deposit, both in terms of the distribution of geological units informing the estimation domains and of grades and other geometallurgical attributes. These realizations are conditioned to available data and reflect the spatial uncertainty inherent in the subsurface. Then, these models are assessed with the fixed mine plan and the risk of the reserves model can be quantified. This is done by separating different sources and combinations of sources of uncertainty in the assessment. Multi-dimensional scaling is then used to embed the complex sets of realizations into a lower dimensional space. The Kullback-Liebler divergence is used to quantify the difference with the reference model, thus allowing the modeller to rank the sources of uncertainty and identify the main drivers of risk. These can then be mapped to identify where and when in the plan the most significant differences with the original model will occur.
1100 - 1125	**Materiality Judgements in Resource Geology** Frank Browning, *SLR Consulting* Materiality judgements are central to our work as resource geologists. Whether preparing a Mineral Resource estimate or reviewing someone else's, our projects are punctuated by questions of materiality. Decisions range from whether a certain item warrants extra column inches in JORC Table 1 to whether a flaw is considered fatal to a proposed transaction. Such judgements are inherently complex. At each stage of a resource workflow (e.g. data collection and verification, geological interpretation and modelling, estimation, classification and reporting), there are numerous parameters, and their relative materiality varies according to a wide range of project-specific factors (e.g. deposit type, project stage, financial conditions, jurisdiction). A more holistic view is also required. To paraphrase NI 43-101, something that is immaterial today could be material tomorrow; something that is immaterial alone could be material if it is aggregated with other items. This talk explores materiality in resource geology through the lens of waterfall charts, sensitivity analysis, and due diligence reviews. The aim is to use these perspectives, together with the collective experience of the audience, to address a range of practical questions: Are some aspects of a resource estimate typically more material than others? How aligned are our judgements of materiality? And how does this compare with the way we allocate time and effort across resource tasks, and with our longer-term investment in skills development and technological solutions?
1125 - 1145	Q&A
1145 - 1245	Lunch Break
Session Two *Chaired by Tracey Laight, SRK Consutling*	
1245 - 1310	**Determination of gold characteristics for sampling optimisation – Evaluation of "representative" sample mass** Dr. Simon Dominy, *Camborne School of Mines* Sampling and assaying protocols aim to achieve an acceptable estimation variance, as expressed by a low nugget variance compared to the sill of the variogram. With gold ores, the typical heterogeneity and low grade generally indicate that a large sample size is required, and the effectiveness of the sampling protocol merits attention. *Continued on the next page....*

Session Two continued...	
1245 - 1310	While sampling protocols can be optimised using the Theory of Sampling, this requires determination of the liberation diameter of gold, which is linked to the size of the gold particles present. In practice, the liberation diameter of gold is often represented by the most influential particle size fraction, which is the coarsest size. It is important to understand the occurrence of gold particle clustering and the proportion of coarse versus fine gold. This paper presents a case study from VIC, Australia. Visible gold-bearing Laminated quartz Vein (LV) ore was scanned using X-ray Computed micro-Tomography (XCT). Gold particle size and its distribution in the context of liberation diameter and clustering was investigated. A combined mineralogical and metallurgical test programme identified a liberation diameter value of 850 µm for run of mine (ROM) ore. XCT data were integrated with field observations to define the size of gold particle clusters, which ranged from 3–5 mm equivalent spherical diameter in ROM ore to >10 mm for very high-grade ore. For ROM ore with clusters of gold particles, a representative sample mass is estimated to be 45 kg. For very-high grade ore, this rises to 500 kg or more. An optimised grade control sampling protocol is recommended based on 11 kg panel samples taken proportionally across 0.7 m of LV, which provides c. 44 kg across four mine faces.
1310 - 1335	**The Rocks Speak if you Ask the Right Question** Dr. James Cleverley, *IMDEX* At some point in the evolution of a mining project, you must test the sub-surface with drilling, sampling, and analysis to support decisions. One of the long-standing challenges in our industry has been the glacial pace of this drilling-sampling-analysis-decision cycle in driving project value. In the last 10-15 years there has been an explosion in rapid geo-sensing technologies creating a lot more data from the rocks. However, the increase in data has made it harder to convert it into useful information, while overwhelming the geologist in the middle. In the last few years the extremely rapid development of AI technologies, especially Machine Learning (ML), Large Language Models (LLMs) and Computer Vision, have been deployed to help grapple data into information. While many of these tools are currently being focused on discovery challenges, this information, when properly curated, can help to add dimensions of information into the understanding of the ore body that should have an impact on the risk management and reporting. How can we build information models into the Mineral Resource Estimation process that allows for dynamic NPV/Planning models at the time of drilling? How can we quality check information and be confident in the “black box” tools being used? This presentation will touch on the latest tools allowing geo-sensing data analytics to drive more rapid, and scalable Ore Body Knowledge, and the trends and opportunities over the next few years. Considering people in the process, and partnerships not subservience with AI, will be critical to leverage the value that can be bought.The rocks are central to this problem, and tools to help decipher what they can tell us can be used to support discovery, extraction and recovery.
1335 - 1400	**Core scanning - now & future; implementation and change management** James Shreeve, *Digital Lithics* Core scanning technology has grown considerably since its introduction in the late 1980s. Today, there are over 30 core scanning companies deploying a range of sensing technologies on a variety of different scanning platforms. The growth is due to the compelling advantages offered by core scanners, particularly their ability to generate continuous, objective, and depth registered datasets at speeds and resolutions unattainable through conventional visual logging methods. However, despite these benefits, core scanning remains inconsistently implemented and underutilised, with one of the principal barriers to sustained adoption being organisational and behavioural rather than technical. The Technology Triangle illustrates that a successful core scanning project requires balance between three interdependent competencies: technology knowledge, data management capability, and geological interpretation. These map directly onto key stakeholder groups that determine project outcomes: the Supplier and Technology Group, IT, and the Mine and Exploration Teams respectively. Failure most commonly arises from imbalance across these three groups. Using core scanning as a case study, the gap between the right technology and implementation success is examined through change management theory and organisational neuroscience. The Kübler Ross change model demonstrates the emotional responses commonly observed in project teams facing new workflows, unfamiliar data types, and disruption to established practice. Neuroscientific research on decision making and social cognition shows how negative emotional responses, if left unmanaged, can propagate rapidly within organisations, creating resistance barriers that are difficult to overcome and can compromise even well planned and well resourced projects. There is an opportunity to reframe change management not as a supplementary consideration but as a core component of project planning, with stakeholder communication actively structured and embedded from the outset. Achieving successful adoption requires our industry to develop as much understanding of our natural human behavioural responses to change as it does of the measurement physics itself.
1400 - 1420	Q&A
Session Three *Chaired by Simon Dominy, Camborne School of Mines*	
1420 - 1500	Break

Session Three continued...	
1500 - 1525	**The Competent Person and Historical Data – Limitations and Pitfalls** Mark Burnett, *AMC* Legacy data is often treated as a liability in mining projects. As economic, technological, and regulatory shifts renew interest in abandoned or marginal assets, the distinction between existing data and trusted data has become critical. For Competent or Qualified Persons working under CRIRSCO-aligned standards, legacy data presents challenges. Without original assay certificates, documented procedures, or retained samples for re-assay, verifying accuracy, precision, and bias is difficult, yet essential for compliant reporting. Uncertainty also arises from unit conversions and spatial transformations. Historical datasets often use Imperial units and inconsistent coordinate systems. Variability in density methods, confusion between specific gravity and density, and differing analytical techniques further increase risk. These factors directly affect geological interpretation, grade estimation, and project economics. CRIRSCO codes require rigorous review, field validation, relogging, resampling, and drillhole twinning before historical data can be accepted. However, compliance alone does not create value—the key lies in how data is interrogated, integrated, and trusted. A case study from a century-old Archaean gold mine in southern Africa highlights both challenges and opportunities. Data existed as handwritten annotations on plans, supported by hardcopy logs. This static format restricted target identification, production tracking, and investment potential.
1525 - 1550	**Geostatistics and GIS: horses for courses** Prof. Hylke Glass, *Camborne School of Mines*
1550 - 1615	**Update & future of reporting in context of CRIRSCO** Dr. Ed Sides, *PERC* A personal perspective on challenges related to Mineral Resource reporting is provided. **Past challenges: Terminology used to convey planning timeframes and uncertainty.** Interest in reporting on mineral projects to investors is evident from the early 1800s up to the present day. The 20th century saw the development of systems and terminologies for classifying estimates of ore quantities and qualities which led to international agreement on standard definitions for Mineral Resources and Mineral Reserves which formed the basis for the creation of CRIRSCO. Such challenges reflect the need for longer term planning of mineral projects to provide confidence to investors to finance their development. This requires the generation of forecasts of income and expenditure over project lifetimes. Such challenges require the use of systems for classifying estimates into different confidence levels reflecting information availability and reliability which are implicitly linked with planning timelines. **Current challenges: Critical Minerals** In response to supply chain disruptions, and changes in global geopolitics, recent years have seen the development of lists of critical and strategic raw materials in many countries, together with an increased interest in aspects such as greenhouse gas emissions and more efficient use of mineral products. Such developments bring new challenges in terms of trying to estimate resources and reserves of minor elements such as gallium, indium, rare earth metals, many of which can only be reliably estimated and extracted from intermediate products obtained during downstream processing. To meet such challenges, more attention must be paid to the estimating quantities of final mineral products rather than in-situ material or run-of-mine material. **Future challenges: Robots and artificial intelligence** New challenges will arise from the search for alternative sources of minerals in remote locations such as the seabed and space which will likely only be accessible to robots for sampling and investigation purposes. Additionally, many of the estimates and reports prepared in the future are likely to be generated partly, or wholly, using artificial intelligence-controlled systems where the underlying logic may be hidden in proprietary and dynamically changing algorithms. .
1615 - 1635	Q&A
1635 - 1650	**Wrap up** Prof. Julian Ortiz, *Camborne School of Mines*
1635 - 1700	**Closing words** Dr Simon Dominy, *Camborne School of Mines*
1700 - 1900	Drinks Reception in the Lower Library. Sponsored by MACL.

Convenors:

- **Simon Dominy,** Camborne School of Mines
- **Hylke Glass,** Camborne School of Mines
- **Julian Ortiz,** Camborne School of Mines

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