16th SGA BIENNIAL MEETING
KEYNOTE SPEAKER

In concurrent session: *Gold in metamorphic terranes - new research approaches, new models, and new target areas*

Julian Vearncombe

PO Box 99699, Newmarket 1149, New Zealand

Function and status of structural geology in resource management

Deliberately lowbrow, this presentation examines the application of structural geology to company mine and exploration sites. The presentation is about the background science that is necessary, often assumed, but rarely explained. I will overview the history of applied structure, cognitive skills, site structural geology practice and deliverables.

- Basic, nuts and bolts structural geology is an unheralded success story in mining globally.
- Applied structural geology had an especially rocky history with a false start in the 1930s and 40s but it is now practised daily and in house by most mining and exploration companies.
- In the past ten years applied structural geology has changed dramatically.
- The necessary 3D cognitive skills of a structural geologist include disembodying, volumetric thinking, dynamic reasoning, and scaling.
- Modelling in 3D has come of age, essential structural data are integrated with other data, but the computer product is a hypothesis to be tested, not a silver bullet.
- Modern 3D computer visualisation helps with volumetric thinking, but there is no computer alternative to the 3D cognitive geologist.
- It is detail that makes for new discoveries and deposit extensions.
- The displacements on faults that host mineralisation are typically measured as a few metres, and company structural geology should be conducted at the metre scale. (Conveniently, this is the scale at which a mine site is run.)
- A diversity of settings, control and geometry makes it critical to document what you've got, as distinct to what is in a pre-expected conceptual model.

16th SGA BIENNIAL MEETING
KEYNOTE SPEAKER

In concurrent session: *Gold in metamorphic terranes - new research approaches, new models, and new target areas*

- Brownfield's exploration in Australia and globally, has grown many-fold mineral deposits beyond the start-of-mine Reserve with structural geology central to that success.
- Because of embedded knowledge the same geologist who took the readings should also be entering, plotting data, synthesising, modelling, and presenting the results to management and Directors. (The author agrees with those who suggest they all deserve a pay rise.)
- The primary deliverable of structural geology is images(s) be they hand-drawn or computer-generated showing the relationships of mineralisation, geology and mine-site infrastructure/design.
- Whilst detailed MSc+ structural work has its place and uses, the value-add performed by a minerals company is the systematic building and communication of a 3D picture of the details in structural geology, stratigraphy and lithology.
- Whilst structural geology is the success story in brownfields exploration, it remains under-utilised and under-developed in Resource evaluation.
- Structure, and kindred topics field work and 3D data modelling should be obligatory in all university geology degrees.

Julian Vearncombe

Julian is a graduate of the Universities of Leeds and Wales. He is an economic geologist with more than 40 years' experience working across the value chain of the mineral resource industry, and on all continents except Antarctica. His energetic and varied career includes academia, technology development and as a company director. Julian has expertise in precious, base and strategic metals. A significant focus of his working career has been the application of effective structural geology to mineral exploration and mining.