3D GEOMODELLING
08 OCTOBER 2021

GSSA
Geological Society of South Africa

CPD POINTS
8 GSSA
1 SACNASP

ABOUT THE WORKSHOP

Recent trends in mining and exploration are set to further accelerate the demand and growth of 3D geological modelling software. These trends include the inevitable increase in cost per ton of resource and global economic slowdowns. These require companies to constantly cost-cut during extraction and to improve resource delineation. Add to this the trend that new discoveries are deeper and in more structurally-complex setting, and it's apparent that a great deal of attention needs to be focused on getting the geometry of a deposit, as early as possible in the exploration and mining value chain, correct.

REGISTRATION

Members – **R3,000**
Non-Members – **R3,500**
Students/Retired/Academic – **R2,000**

REGISTER NOW

Recent trends in mining and exploration are set to further accelerate the demand and growth of 3D geological modelling software. These trends include the inevitable increase in cost per ton of resource and global economic slowdowns. These require companies to constantly cost-cut during extraction and to improve resource delineation. Add to this the trend that new discoveries are deeper and in more structurally-complex setting, and it's apparent that a great deal of attention needs to be focused on getting the geometry of a deposit, as early as possible in the exploration and mining value chain, correct.

The versatile application of well-built, validated 3D models is one of the most important tools for achieving this and forms the basis for all downstream processes. From the point of view of drillhole targeting, resource extension, geotechnical design, infrastructure and cost simulation, pre- and post-blast surveying, geohydrological simulations, truck and bucket volume calculations and many other routine mine tasks, 3D models are a common and necessary denominator.

The past decade has seen a tremendous growth in the capabilities of almost all commercial 3D geomodelling packages, to the point where they run on high-end PCs. This growth has changed the complexion of mineral exploration and mining; there is now a huge overlap in terms of basic volume modelling and manipulation between commercially-available, general modelling packages and those specifically tailored for use in geology and mining. Recent trends are away from software packages that have unforgiving data import routines, use explicit, section-based modelling and which incorporate limited data sets or types. The trend is towards software packages that have flexible import routines; rapid, dynamic, implicit modelling of surfaces and shells, integration of large numbers of disparate data sets and 3D querying of spatial data to determine trends and patterns. These typically incorporate an easy, workflow-driven approach.

The one-day online course takes you through:

- An overview of the various data types that should be combined and examined in a typical model-building process
- The applicability of specific modelling techniques and philosophies, to various deposit types and problems
- The processes of 3D geological modelling and the techniques employed
- The differences between explicit, implicit and rules-based conditional modelling, and up-to-date trends in their related mainstream software packages
- Incorporation of structural data to create a fault network
- Tertiary use of 3D models, such as surface dip analysis, apparent dip analysis, 3D querying, intelligent targeting and trend analysis
- A review of most commercial or mainstream 3D geomodelling packages used in the minerals industry

BENEFITS OF ATTENDING

- The course is not specific to any modelling package, but rather uses a "nuts-and-bolts" approach, by way of presenting the underlying data and techniques employed
- The course provides a broad overview of 3D modelling packages applied to exploration and mining
- The course provides an overview of the various data types that should be combined and examined in a typical model-building process, in order to create fully-constrained 3D models
- The applicability of specific modelling techniques and philosophies, to various deposit types and problems, will be discussed. Inter alia: exploration models; geophysical data inversion; resource estimation models; geotechnical models, conceptual models are touched upon
- Basic definitions of points, lines or polylines and polygons, and varieties in nomenclature, are covered
- The attendee will gain a thorough understanding of the processes of 3D geological modelling and the techniques employed, to the point where they should have the tools and vernacular to approach basic 3D modelling in virtually any software package
- The differences between explicit, implicit and rules-based conditional modelling, and up-to-date trends in their related mainstream software packages, will be presented
- Incorporation of structural data, in order to create a fault network, will be demonstrated by way of several examples
- Tertiary use of 3D models, such as surface dip analysis, apparent dip analysis, 3D querying, intelligent targeting and trend analysis will be addressed
- Commercial or mainstream 3D geomodelling packages will be discussed, based on a set of key criteria and workflows

WHO SHOULD ATTEND

Geologists (mainly Junior, Mining, Exploration, Hydraulic, Engineering, Resource) | Exploration Managers | Geotechnical Engineers (Engineering Geologists) | Surveyors | Mine Planners Academics (Professors, Lecturers in Geoscience and Geology Departments) | Consulting Companies Mineral Resource Managers | Mining Engineers | CEOs

ABOUT THE SPEAKER

Dr Ian Basson

Ian qualified with a Ph.D. in Structural Geology from the University of Natal (now Kwazulu-Natal) in 2000. He completed his Post-Doctoral Studies at the University of Cape Town, with a focus on the structural controls on kimberlite emplacement, in 2002. Ian is a professional structural geologist with over 20 years' experience in mapping, structural analysis and 3D modeling. His skill set includes mapping of complex structural environments, including high-grade metamorphic terranes and those with a significant brittle-ductile or brittle overprints; structural and lithological mapping of open-cast mines; translation of structural features into parameters that are used by geotechnical engineers and mining personnel in pit slope design and mine planning; 3D modeling of complex geology; lithological and structural interpretation of geophysical and Landsat/ASTER data sets; forward structural modelling in greenfields or brownfields exploration projects using stress mapping and modelling. Ian has undertaken over 150 projects for his clients and has published 32 peer-reviewed articles. He is a Senior External Lecturer at the University of Stellenbosch, where he presents the Honours Geology class with a course on general 3D modelling and a practical course in Leapfrog.

PROFESSIONAL ORGANISATIONS

- Practicing Natural Scientist, S.A. Council for Natural Scientific Professions (Pr. Sci. Nat.)
- Fellow of the Geological Society of South Africa (GSSA)
- Member of the Society of Economic Geologists, U.S.A. (SEG)
- Associate Member of the S.A. Institute for Engineering and Environmental Geologists (SAIEG)

EXPERIENCE

Ian founded Tect Geological Consulting in 2002 (www.tect.co.za). Since then, Tect has worked on 38 deposit types in 23 countries throughout Africa and Middle East. Tect's main clients are Kumba's Sishen and Kolomela operations, Venetia Mine (De Beers), Voorspoed Mine (De Beers); Palabora (RTZ); Jwaneng, Orapa, Letlhakane and Damtshaa Mines (Debswana); Geita Main and Star and Comet Pits (Geita Mine, AngloGold Ashanti); Chimiwungo (Barrick), Kansanshi (First Quantum Minerals), Northam Platinum's Zondereinde and Booysendal Mines, Amandelbult's Moddergat Area (Anglo Platinum), Lonmin Marikana 2# and PTM's Waterberg Prospect.

PROGRAMME

DATE: 08 October 2021

NAME OF EVENT: 3D GEOMODELLING WORKSHOP

TIME	TOPIC	SPEAKER
7:30 - 8:00	*Registration & Introduction*	Ian Basson
8:00 - 10:00	Session 1 - Introduction and General Concepts	
	Session 2 - Choice of Software Package	
	Session 3 - Geometries and Raw Data	
	Session 4 - Data Verification and Validation	
10:00 - 10:30	*Tea Break*	
10:30 - 12:30	Session 5 – Drillhole Data	
	Session 6 – Explicit Modelling	
	Session 7 – Surface Modelling	
	Session 8 - RBFs	
12:30 - 13:15	*Lunch Break*	
13:15 - 15:15	Session 9 – Implicit Modelling	
	Session 10 – Rules-Based Implicit Modelling	
	Session 11 – Modelling of Structures	
15:15	*Tea Break*	
15:45	Session 12 – Model Validation	
	Session 13 – Use of Validated Models Session 14 – Software Package Reprise Session 15 – Summary and Wrap-up	