



16th SGA BIENNIAL MEETING KEYNOTE SPEAKER

In concurrent session: *Spatial data analysis for mineral exploration*

Nicole Januszczak

Practice Lead Mineral Systems, Geoscience Excellence, Resource Centre of Excellence, BHP, Toronto, Ontario, Canada

Using multidimensional mineral systems-based predictive models to tackle the growth challenge facing the mining industry



In the future, most significant discoveries will be under cover in technically challenging environments that render them blind to our current exploration toolkit for predicting and detecting ore deposits. To address this gap, we will rely increasingly on insights from predictive modelling and machine learning. An integral part of this approach will be to identify and test datasets we do not routinely use, and to apply datasets in new and innovative ways. Picking the right ground to explore is key to successful exploration. Considerable value lies in front-end loading predictive modelling at global and regional scales to ensure that we are exploring for world-class in the best mineral belts in the world and not exploring for the best deposit in a mediocre belt. A mineral systems approach to exploration is predicated on an understanding of the critical processes that need to align in space and time for an ore deposit to form providing critical grounding for predictive models. The opportunity in this space is truly extraordinary. At BHP we have learned from our success in petroleum exploring in remote and deeply buried (deep underwater) environments. With application of systems thinking and the development of technology to image the petroleum system, they can now take an area the size of London, and with the light from eight lampposts, they can essentially draw a map of the city. We are being similarly challenged in minerals. As with petroleum systems, mineral systems operate across all scales, spatially and temporally, enabling an adaptation from two dimensional prospectivity maps that focus largely on the shallow parts of a mineral system to holistic predictive modelling which are based on a comprehensive understanding of mineral systems in four dimensions, deep into the Earth system and back in time.

Nicole Januszczak

Nicole joined BHP in 2020 as Global Practice Lead Mineral Systems in the Resource Centre of Excellence, based in Toronto, Canada. In this role Nicole guides global teams across a range of commodities to understand and apply mineral systems to enable a step change in the discovery of new economic deposits. Prior to joining BHP, Nicole held a number of senior positions at De Beers Group including Senior Exploration Manager for the Americas. She has a Ph.D. degree in Geology from the University of Toronto and over 20 years' experience predicting, targeting and exploring for minerals and metals around the world.
