

# **The distribution and genesis of gold mineralization on the Fremont Property in the Mother Lode gold belt in California**

**S. Skitch <sup>1</sup>, J.E. Mungall <sup>1</sup>**

<sup>1</sup>Department of Earth Sciences, University of Toronto, Toronto, Ontario

The Mother Lode gold belt hosts orogenic lode gold deposits along a 200 kilometre trend along the western portion of the Sierra Nevada fault block. This shear zone, locally called the Melones fault, divides early to mid Jurassic metasediments and metavolcanics in the west from Jurassic phyllites, siltstone, and tuffs in the east. Historically, this district has produced over 50 million ounces of gold. The Fremont property hosts the Pine Tree-Josephine deposit near the southern end of the Mother Lode gold belt. Pine Tree-Josephine is the most significant of four deposits on the property. It generally strikes NNW and dips moderately to steeply east over a strike length of 800 metres with a maximum width of 150 metres. The Pine Tree-Josephine lode gold zone is structurally controlled and associated with several different vein types within the Melones shear zone and its western margin. Here the Melones shear zone is a serpentinite melange containing blocks and fragments of metavolcanics, finer grained felsic to intermediate dikes, and a mottled breccia. A large portion of the serpentinite body has been replaced by talc-carbonate alteration zones containing abundant quartz and characteristically coloured green by mariposite. The deposit contains multiple types of mineralization associated with several vein types. High grade lode gold veins are associated with grey quartz, displaying banding with crack and seal and breccia fill textures. Moderate grade mineralization is associated with quartz-albite-ankerite veins and veinlets with pinching and swelling morphology. Moderate to lower grade mineralization is associated with the appearance of disseminated sulfides in finer grained dikes, altered quartz porphyries, and metasediments. These mineralization styles are spatially distributed in zones that are commonly moderately steeply dipping. The objective of this project is to look at the geochemical, mineralogical, and structural controls on the distribution and genesis of the gold mineralization found on the Fremont property. Core logging, optical and electron microscope petrography, in conjunction with compilation of legacy data sets are being used to constrain the relationships between mineralized zones and alterations types in the context of deposit-wide structural controls on the gold mineralization.