

# UTEM

**Bruce McMonnies, Sr. Geophysicist, Lamontagne Geophysics Ltd.**

**Special Lecture: Feb 8 at 2:30pm in RM 201, Miller Hall, Queen's (livestreamed)**

## SUMMARY

In this talk I will provide an overview of the UTEM (University of Toronto Electro-Magnetic) system, comprising advanced geophysical instrumentation and related software operated by Lamontagne Geophysics Ltd. in Kingston designed to explore for deep conductive orebodies or related targets via surface and borehole surveys, together with an appreciation of its inventor, the brilliant geophysicist Dr. Yves Lamontagne, who sadly left us last month.

UTEM was originally developed by Yves as a PhD student at the U of T in the 1970s in collaboration with Dr. Gordon West. It is unique among the diverse EM systems and devices in that it measures the step function of the earth generated by a specially designed transmitted waveform in the On-time, rather than measuring the off-time impulse response generated by a current square wave utilized by most time-domain EM systems.

Thanks to many improvements and innovations primarily developed by Yves in his constant quest to push the systems' capabilities, the current version (UTEM 5) can readily detect conductive targets at depths of 1000m for surface surveys measuring from up to three transmitter loops simultaneously at frequencies less than 4Hz. Borehole UTEM is currently able to obtain high signal-to-noise triaxial EM data in holes down to 3400m. The current version BHUTEM4 can detect and delineate both in-hole and off-hole conductors, with off-hole conductors detectable 800m and more away from the hole. Parallel advances in software for data processing and modelling of observed EM responses now enable quantitative interpretation of complex conductive features for both surface and borehole surveys.

UTEM surveys have been performed by dedicated LGL crews around the world over the past 45 years, leading to many important deposit discoveries, notably at depth in the prolific Sudbury Cu-Ni camp, thereby sustaining the continuing operations of Vale, Glencore and KHGM and contributing to the economic vitality of Sudbury. Some notable UTEM case histories will be presented and discussed, providing clear confirmation of the importance of Yves' contributions to the geophysical arsenal needed to search for ever-deeper ore deposits, as recognized by the Cecil Green award by the Society of Exploration Geophysicists and by his designation as a KEGS Pioneer by the KEGS Foundation. LGL looks forward to continuing to provide leading-edge geophysical services that will contribute to the discovery of more deposits in the future. Hopefully, students and younger researchers will be inspired by Yves' remarkable career to pursue efforts to further improve geophysical and related technology that is critical to the continued success of the Canadian resource sector.