



# CSPG ROCK ANALYSIS WORKSHOP

March 21-22, 2019 | University of Calgary & AER Core Research Centre

## **Digital rock characterization: A powerful tool for core characterization and quantification of rock properties**

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### **Summary**

Rapid, non-destructive screening using high-frequency imaging techniques now provides a viable solution for not only superior visualization but also detailed quantitative core assessment. These deliverables are available before the core is removed from the inner core barrel and other measurements are commenced. Further, X-ray scanning at two energy levels provides high resolution bulk density and photoelectric factor measurements. These data in conjunction with extensive laboratory-based mineralogy and density calibrations result in a solid interpretation of core mineralogy and therefore, a mineralogy log. Such high definition X-ray data at 250 micrometer resolution also provide information complementary to borehole images which makes bedding interpretation advanced and accurate. A tertiary benefit of this technology is its use as an aid in sample selection decisions for geological, mechanical and advanced rock testing, leading to a higher confidence in reservoir upscaling.

Micro CT scans at very high resolutions can resolve features as small as 0.3 micrometers. Image acquisition and segmentation at sub-micron resolutions helps characterize pore systems: pore bodies and throats, tortuosity and interconnectivity resulting in excellent pore geometry resolution. This information, when consolidated with appropriate physical measurement-based calibrations, provides porosity, permeability, and capillary pressure data. Pore network quantification helps characterize tortuosity to result in resistivity, formation factor, and cementation exponent modeling.

These new image acquisition and processing techniques not only provide tools to characterize reservoirs but also deliver rapid and accurate petrophysical measurements.