Teaching AI the Language of Rocks: Transforming Orebody Knowledge

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Orebody Knowledge (OBK) is increasingly recognised as the critical foundation for value creation across the mining value chain. Yet our most fundamental tool for building OBK — the rock microscope — has changed little since the 1860s. Even with digital imagery, the work has remained manual, siloed and dependent on skills that are literally retiring out of the industry.

RockStein is changing this. For the first time, automated multi-modal capture of thin and polished sections is being combined with petabyte-scale cloud storage and physics-informed artificial intelligence. Over the next three years, more than one million rock sections will be digitised into a unified, queryable, cloud-native library. Critically, this is not “AI for AI’s sake”: RockStein embeds the physics of mineral equilibria, disequilibria, pressure–temperature paths, prograde and retrograde metamorphism — allowing the system to reason about Earth processes, not just recognise pixels.

The result is a platform that geoscientists can use without friction: the same workflows, the same samples, but with orders-of-magnitude more insight, speed and reproducibility. Old datasets gain new life, new datasets scale globally, and together they create an enduring resource for exploration, mining, and academic research.

This is not AI being imposed on us by outsiders who don’t understand our industry. This is geoscience bringing AI to itself — by geologists, for geologists, grounded in our science and our workflows. RockStein is designed to be transformative: turning the sunk cost of generations of microscope work into the foundation of a new era of OBK.