

Item for ASEG Preview and Newsletter

## 2023 Winner Richard Lane Scholarship



The winner of the third annual Richard Lane Scholarship is **Claire Mortimore** from the School of Earth Science, University of Western Australia. Claire is undertaking an Honours degree in Geophysics and has been awarded \$5,000. Claire’s supervisor is Professor Mike Dentith.

The ASEG Scholarship has been established to support Geophysics Honours and Masters Students and to commemorate the life and work of ASEG Gold Medal recipient Richard Lane. The scholarship is open to all BSc (Hons) and MSc geophysics students and consists of a grant of \$5,000 to the best ranked student for the current year. Ranking is based on a 200 word discussion, overview of geophysics project and on their academic transcript. For 2023 we acknowledge and thank the donation and concept from Jayson Meyers and Resource Potentials Pty Ltd.

The scholarship is an annual event and donations to support the continuation of this scholarship are sought from institutions, companies and individuals. Information on donations via the ASEG Research Foundation can be found at [www.aseg.org.au/foundation/donate](http://www.aseg.org.au/foundation/donate) Please mark donation specifically “Richard Lane Scholarship:”

### **Honours project description:**

**Project title:** *Geophysical Exploration for Graphite Mineralisation on the eastern Eyre Peninsula, South Australia.*

**Description:** The research project concerns processing and interpretation of new geophysical data from the Koppio and adjacent Kookaburra Gully graphite prospects, seeking to understand geological controls

on graphite mineralisation and to assess how best to use geophysical data when exploring for graphite resources in this geological environment.

This involves working with newly acquired and existing geophysical data from the prospects. This includes recently acquired ground and airborne Time-domain EM (TEM) collected by Lincoln Minerals in collaboration with Terra Resources, and Geological Survey of South Australia (GSSA) funded aeromagnetic data. Historical geophysical surveys completed in the 1950's and 1980's include frequency-domain EM and self-potential (S.P) surveys and are also available.

The overarching goal is to determine a workflow for geophysical exploration of graphite in the high-grade terrains of the eastern Eyre Peninsula. A set of subsidiary objectives are listed below and contribute to the achievement of the overarching goal.

**Research objectives:**

I. Using the GSSA regional magnetic data; complete a geological interpretation over the Koppio/ Kookaburra Gully and Uley areas to identify possible district-scale structural controls on graphite mineralisation. Compare and contrast regional TMI at Koppio/ Kookaburra Gully to Uley. Are the controls on graphite mineralisation similar?

II. Interpretation of detailed airborne EM (AEM) and magnetic data from Koppio to determine prospect-scale controls on mineralisation.

III. Compare TEM and AEM. Is the cost of AEM warranted? Is EM, overall, a reliable indicator for graphite exploration across the eastern Eyre Peninsula?

IV. Compare the modern geophysical data with the legacy datasets. Frequency domain EM is rarely used today, instead Time-domain EM (TEM) is the industry standard electromagnetic survey method. TEM is generally; more efficient and simpler to operate, has a greater depth penetration, higher signal: noise ratio and is more cost effective than frequency domain EM. Similarly, S.P data is slow to acquire, and often ambiguous in interpretation and has been consequently replaced by more modern geophysical survey methods. The question becomes, how much more effective are the modern geophysical exploration techniques than the outdated techniques? Does the new data (TEM) alter the existing interpretation of the Koppio graphite deposit?

V. Petrophysical measurements: Collect magnetic susceptibility and inductive conductivity physical property measurements on mineralised and non-mineralised samples at Koppio. These data will be used for calibration of geophysical interpretations.

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**Why Claire is studying Geophysics (~200 word discussion):** I was first exposed to mineral exploration geophysics in my undergraduate years where I took a keen interest in geological mapping and geological

interpretation of geophysical data. I appreciate the versatility of geophysics and see it as a science that can adapt well to a variety of subspecialties including environmental science, agriculture, and archaeology. I have personally applied near surface geophysics in archaeological contexts and in groundwater mapping and these field investigations and these were particularly fascinating and highlights of my junior career thus far.

Geophysics has allowed me to integrate multidisciplinary datasets and interpret them in a broader geological context to solve complex problems. Studying under Mike Dentith at UWA and later working under Barry Bourne at Terra Petrophysics, I learned about petrophysics in a mineral exploration context, which I consider to be the key to linking conflicting geological and geophysical datasets. My background in petrophysics has allowed me to develop a thorough understanding of the foundations of geophysics. As a Geoscientist and Laboratory Manager at Terra Petrophysics, I have had the chance to participate in geophysical fieldwork using techniques such as Loupe TEM and GPR. Most recently, I acquired Loupe data over my research prospect in South Australia. The latest magnetic and conductivity physical property measurements over the south Eyre Peninsula were taken in the 1950s. This warrants a need for the collection of more recent petrophysical data from the available A.C. and outcrop, especially given M. Dentith's more recent petrophysics in the Eyre Peninsula over Uley, which showed dissimilar results to the historical values. Therefore, I believe it would be valuable to conduct reinvestigation with modern instrumentation over the Koppio prospect in South Australia which would involve additional travel and field expenses. The funding from this scholarship would support the research project in this way.