Lesley Wyborn

Grahame Sands Award

Brisbane September 2021

CITATION:

This award is based on an endowment made by members of the ASEG and the geoscience profession in memory of the late Grahame Sands, who was tragically killed at the prime of his life in an aircraft accident in 1986, whilst developing and testing new equipment for geophysical survey aircraft. Because of Grahame's abilities to turn scientific theory into innovative application, the award is made for innovation in applied geophysics through a significant practical development of benefit to Australian exploration geophysics in the field of instrumentation, data acquisition, interpretation, or theory.

The Grahame Sands Award for 2021 is presented to Dr Lesley Wyborn from Canberra, in recognition of her initiation of the mineral systems framework concept, as well as her long-standing contribution to the F.A.I.R (findable, accessible, interoperable and reusable) data principles as applied to geoscience data. Both of these concepts are pivotal to the current mineral exploration landscape and underpin major Australian initiatives by federal and state governments, AuScope, the National Computational Infrastructure (NCI) and the Australian Research Data Commons, as well as exploration companies.

Her recent work in geoscience data standards and F.A.I.R. principles lays the foundation for future machine learning and artificial intelligence approaches to geoscience data. Her work ensures future competitiveness and success of mineral exploration in Australia and paves the way for the prosperity of our nation.

Lesley has had a long and distinguished career as a research geoscientist. After graduating from Sydney University in 1972 with first class honours in Geology, Lesley joined the Bureau of Mineral Resources (BMR) in Canberra in 1972, and over the next 42 years, held research scientist, information management scientist, and senior geoscience advisor roles with the BMR and its subsequent incarnations, the Australian Geological Survey Organisation and Geoscience Australia.

Lesley took leave from the BMR from 1974-1977 to complete a PhD in Geology at the Australian National University (ANU). In 2014, she became an Adjunct Fellow at ANU and is currently Honorary Professor at ANU.

Lesley pioneered the mineral systems framework concept, and revolutionised the approach to mineral exploration. Her 1994 paper, with Chris Heinrich and Lynton Jaques, 'Australian Proterozoic Mineral Systems: Essential Ingredients and Mappable Criteria,' laid the foundation for a multiscale, process-based view of determining fluids and 'mineral' systems in the Earth's crust. This approach spanned all deposit types and broke the industry away from a 'taxonomy' approach to classifying deposit types, to one that focussed on observing empirical relationships of the distribution of minerals to geological and geophysical features on a district to regional scale.

Lesley was one of the first to put this systems approach into action in a GIS-driven prospectivity analysis, enabling the foundation for subsequent GIS-based concept-driven methods, enabling the conversion of those parameters into mappable criteria that can be computationally modelled as part of regional scale fluid flow analysis to help understand why ore deposits form where they form. Lesley's work transformed the approach to interrogating the mineral exploration search space, and has influenced the way industry approaches prediction and detection of new ore systems.

In more recent times, Lesley's work has gravitated toward enabling geoscientists to better utilise publicly available data at full resolution using high-performance computational facilities. Amongst her recent achievements is her contributions to the development of standards that enable machine readability, thus providing simple machine-to-machine access to open-source geoscience data. With geophysicists collecting data at ever increasing rates and at higher resolutions, the role of data management systems, and adherence to the F.A.I.R. principles of data have become increasingly important. Lesley has been one of the key drivers in Australia of the F.A.I.R. principles, promoting and advocating that all publicly-funded data becomes F.A.I.R. An example of this is her work in facilitating the accessibility to time-series magnetotelluric data that were acquired as part of the national AusLAMP project.

Lesley has made many outstanding contributions to the field of geoscience. She has fought hard to make geophysics a more diverse and inclusive workspace, often encouraging contributions to national and international conference sessions focussed on these matters. She has contributed to AGU, one of the largest international geoscience associations, on matters of diversity and inclusion to help transform workplace culture at scientific institutions.

Lesley has worked hard to ensure Australian perspectives and priorities on diversity, equity and inclusion are considered in international initiatives by consulting broadly in her roles on the AGU Diversity and Inclusion Advisory Committee. She has also represented Australia in a panel to understand international perspectives on inclusive science priorities and opportunities from different regions of the world and discuss local priorities for scientists in their respective countries.

Lesley has been an active participant in ASEG and more recent AEGC conferences, with one or more presentations at these conferences. She has also contributed to the ASEG's *Preview* and *Exploration Geophysics* publications.

Lesley has been recognized by other organizations with several awards for her outstanding career achievements, but it is now prudent that the Australian geophysics community give Lesley the recognition she deserves for her innovative contributions to the science and practice of geophysics with the ASEG Grahame Sands award.