



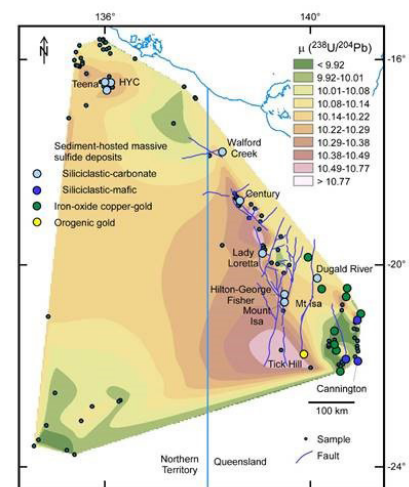
## SC5: Isotopes in economic geology, metallogensis and exploration

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Even though their existence was not recognised until the 1930s, isotopes have played an important role in understanding geological systems since the early 1950s, when the first isotopic papers were published in the geological literature. Isotopes have played important and continuing roles in developing models of mineral systems at scales from microscopic to continental. This short course will provide an overview on the use of isotopes in ore genesis and metallogenic studies and how isotopic data has and could be used in exploration. Topics to be covered include the use of the U-Th-Pb, Re-Os and K-Ar systems in dating mineralising and related events; the use of radiogenic isotope systems (U-Th-Pb, Sm-Nd and Lu-Hf) as source tracers and in isotopic maps; the use of light stable isotopes (O-H, S and B) in identifying fluid, sulfur and boron sources and geochemical processes in mineral systems; and the use of metallic stable isotopes (Cu, Zn and Fe) to directly determine ore metal sources and assess geochemical reactions related to mineralisation.

The short course will be based upon a book with the same title to be released in early 2023 as part of the SGA-Springer Mineral Resource Reviews book series. Copies of this book will be provided to the participants.



After completing a PhD at the University of Tasmania and working at the Geological Survey of Canada, David Huston joined Geoscience Australia, where he is now a Principal Research Scientist. His current research interests include many aspects of mineral system science, particularly the link between tectonics and metallogensis. This research combines data from radiogenic and stable isotopes with other geological, geochemical, geochronological and geophysical data to understand controls on metallogensis at scales from the deposit to the continental, and, thereby, provide new exploration insights and tools.



Cyril Chelle-Michou is Professor of Mineral Resource Systems at ETH Zurich, Switzerland. He received his PhD from the University of Geneva. He is mainly interested in quantifying the geological processes that modulate the size of magmatic-hydrothermal and sediment-hosted hydrothermal deposits and in developing new exploration methods and decision tools to help targeting the biggest orebodies as early as possible. He heads the high-precision U-Pb geochronology laboratory of ETHZ and develops new methods to broaden the applications of the U-Pb system across mineral systems.



Crystal LaFlamme is an Associate Professor and holder of the Canada Research Chair in Sulfur isotope geochemistry at Université Laval. Her research program focuses the development of geochemical tracers and their application to tectonic processes and mineral systems, especially in Precambrian terrains. To do so, she runs an LA-ICP-TQ-MS lab focused on the development of in situ sulfur isotope measurements in sulfides.



Ryan Mathur is a professor at Juniata College. He earned a B.A. in History and Geology from Juniata College in 1997 and Ph.D. in economic geology and isotope geochemistry from the University of Arizona in 2000. He has worked a large variety of ore deposits in many different areas with the focus of geochronology of sulfide minerals (Re-Os and several other chronometers) and transition metal (Ti, Fe, Cu, Zn, Mo, Ag and Cd) and metal (Sn) isotope geochemistry. He has published over 130 papers in peer reviewed journals and worked with many mining industry, academic, and governmental agencies across the world.