



AGES pre-conference workshop – Monday 17 April - 10am-4pm

Interpreting surface geochemistry with machine learning-derived landscape context using the UltraFine+® method

This workshop will introduce concepts and example applications of using novel soil analytical methods and machine learning (ML) to better interpret geochemical results in landscape context for minerals exploration. We will cover the background science that led to the development of the commercially available UltraFine+® soil method and the Next Gen Analytics package, with examples from across Australia, including the NTGS data package. ML-landscape mapping applications that are not specific for UltraFine+® soil geochemistry and surface geochemical results will also be presented and we will show how the ML outputs were derived, and, more importantly, some tips and tricks to derive them manually, e.g., from regolith maps, to get more out of surface soil geochemistry. We will also highlight some of the other Next Gen Analytics workflow outputs, such as exploration indices, additional soil properties, dispersion directions and more. The NTGS UltraFine soil survey results from the McDonnell ranges will be used in the course and enquiry based learning and short activities will be incorporated into the workshop.

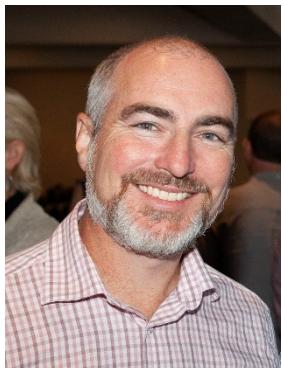
Presenter/contact: Dr Ryan Noble and Dr Anicia Henne (CSIRO)

ryan.noble@csiro.au or Anicia.henne@csiro.au

0400 239 627

Program, a “long half day” with each point being about an hour

Start time	Topic
10 am	Background on the UltraFine+® method and development (why it can work/how it compares to other methods/what the analytical steps are, also where it doesn't work and what other analytical options can work instead)
11 am	Landscape clustering (what's in it, how do you verify/check/understand what it gives you, MrVBF value, methods do to this outside of UltraFine+®)
12 pm	Lunch (a light lunch will be provided)
1 pm	Next Gen Analytics (outlier analysis/principal components/indices/soil properties/QAQC outputs)
2 pm	The Digital Sample Observer (DSO) - demonstration and exploration of real data
3 pm	Case studies and questions/discussion/what's next (NTGS report and others that we can show as examples)
4 pm	Close



Dr Ryan Noble is a Senior Principal Research Scientist and the Group Leader of Predictive Mineral Systems Science. Ryan works on numerous regolith and groundwater geochemistry projects related to gold, base metal, Ni and U mineral exploration. His current project interests are focused on getting the maximum information from soil samples with the least effort, ML-driven landscape classification, and developing the UltraFine+® technique. Ryan is a Past-President and a Fellow of the Association of Applied Geochemists. He is a Board member of the Australian Geoscience Council and the current Chair of Australian Earth Science Education. Ryan likes golf, wine of most varieties and home-handyman projects even though he's not that handy.



Dr Anicia Henne joined CSIRO two years ago working on regolith science related to mineral exploration in, through and below cover. Anicia worked as an exploration and resource geologist in Queensland before completing her PhD at the University of Queensland in a multi-disciplinary research team at the intersection of geochemistry, mineralogy, geology and microbiology to understand (bio)geochemical processes that affect trace metal mobility in surficial geological environments and how they relate to mine waste materials, regolith formation and enrichment within supergene zones. Her current research projects relate to soil geochemistry and UltraFine+® projects. Anicia might be the only German who doesn't like beer and soccer and is happiest on a beach volleyball court.