Tools and strategies for transients multi-messengers detections
- a Franco-Australian perspective –

With the discovery of 170817, from the gamma ray burst [GRB] to its gravitational waves' [GW] detections, through the Kilonova [KN] emission, and after 5 years of search, we are now, more than ever, eager to detect another event displaying those different multi-messengers emissions, including ideally the missing neutrinos. With the start of LIGO/Virgo/KAGRA, the GW detectors, in May 2023, coupled with the launch of SVOM, a franco-chinese GRB dedicated satellite by the end of the year 2023, and the beginning of the large survey with the optical observatory Rubin in 2024, we are entering in a big data era. If we don't develop the correct tools as well as strategies for simultaneous detections of our favourite transients, we will only allow masses of information untreated to pile up.

After reviewing the different missions and programs that I am part of, I will explain different tools that I am working on and how to use those. I will also elaborate on different strategies regarding observing the transient sky. From observing the same tiles over time to reach a depth never achieved before, with 60 different facilities to cover all wavelengths, to analysing, under the threshold of detection, the data coming from GRB satellite like Swift that gives us more GRB events precisely located in a timely manner, I will detail all those approaches. In addition, I will explain how anybody could also use them to join the collaborative effort and how that is best use with the different strategies of observation for large survey telescopes. Finally, I will present the network of Australians researchers, inviting you to our international conference on transients in January 2024 and I will discuss how a French-Australian collaboration could make the difference in the discovery of the next breakthrough multi-messenger transient!