**Week 8: Music as Sound**

One potential advantage of a time-frequency analysis over a waveform-based analysis is that you can see when different instruments are used within a track. For instance, if a piece of music contains a double cello and a piccolo, you would see activity in the lower frequencies when the double cello is playing throughout the piece, and then activity in the higher frequencies when the piccolo is playing throughout the piece.

For example, in comparing the spectrograms of the tracks “Memories Renewed” against “Nocturno 2”, you can see clearly that the former has stronger lower frequencies (172Hz and lower) compared to the latter. This would inform us that “Memories Renewed” is more likely to contain instrumentation which has lower pitched instruments.

Another example would be to notice that in “Memories Renewed”, there is a slight gap in frequency activity in the middle of the song between the frequencies of 689Hz to 2067Hz. Within this time frame it is safe too assume that certain notes or instruments that were playing in the first third of the song stop playing, before being reintroduced for the last third of the song.