Distance metric graphs

- We might expect more fluctuation for higher frequency bands (e.g. low/high gamma) because these have more time to change, hence more fluctuations
- Node comparisons (recruitment/flexibility/integration/flexibility) - begin at the top level, by finding the mean over all nodes and comparing these (via permutation tests for 15 f/m)
    - Then, proceed to system level and node level (although be careful for issues of multiple comparisons - i.e. I think the p-value would have to be set at 0.05/98 if we look at node level)
- Thresholding - add densities of graphs to the distance graphs to see if the differences can be explained by the different levels of sparsity
- What is driving the differences between the distance metrics graphs?
    - Can we explain why the frequency bands are in different orders for each graph in relation to the frequency of the bands?
    - Why are there differences in the bands between metrics?
    - Can we distinguish between male and female based on these bands?

Performing analysis

- Use permutation tests instead of t-tests unless we can see the data follows a normal/Gaussian distribution
- For the static analysis apply the thresholding function to form adjacency matrices before applying the Louvain algorithm
- The Louvain algorithm is deterministic, so it should give the same partitioning every time it is used; however, the initial node labels are assigned randomly in some code, so this can change things. If this is the case with code I find online, just apply it once and take this partition

Structure of the report

- Introduction - to networks/graphs and in particular brain networks including a literature review (i.e. what is the current research)
    - Present data - summary stats about subjects (e.g. 15 females/15 males)
- Static and dynamic analysis - methods
- Distance metrics - methods
- Separate female / male section where we compare subjects
    - This works well as a separate section because we can bring it all together including the brain stuff from the start etc., so good to have a standalone data analysis section (could also include results in each of the methods sections instead)

Moving forward

- Renaud will set up a shared Overleaf document and will email the link around
- Renaud is on holiday 10th - 14th