The medial prefrontal cortex (mPFC) has been associated with a variety of seemingly disparate functions. At the same time, certain functions ascribed to mPFC have been reported in spatially distal parts of this region. Accounts of mPFC function have been hampered by the lack of consensus on its functional spatial organization. A coherent fine-grained topographical map of mPFC would provide a foundation for future accounts of its function. Presently, I propose applying analytical clustering algorithms on resting state functional connectivity MRI (rs-fcMRI) data to parcellate mPFC into distinct sub-regions. Then, I plan to use NeuroSynth to conduct a lexical analysis to determine family of terms most highly associated with each sub region, providing a starting point for specifying each cluster’s function. Finally, I will use NeuroSynth to look-up publications that report activations in each cluster, and write a literature review that describes the function of each sub-regions. This endeavor will help base future accounts of mPFC function on a data-driven architectural scheme and will help adjudicate between existing accounts of mPFC topographical organization.

The medial prefrontal cortex (mPFC) has been associated with a wide variety of seemingly disparate cognitive functions such as action valuation, conflict monitoring, self-reflection, mentalizing, emotion regulation, and memory. Moreover, activations for specific processes, such as “valuation”, are reported in various spatially distal areas within mPFC. The lack of spatial specificity in combination with the plethora of functions associated with mPFC makes it very difficult to infer function from observed activation within these regions. Furthermore, it makes it difficult to create comprehensive theories about this region’s function. These efforts have been hampered by a lack of consensus on the spatial organization of this area. Various theories propose different organizational schemes with divergent predictions. In particular, analytical parcellation methods have not been applied to mPFC as a whole in order to confirm or reject alternate theories. Presently, I propose applying clustering algorithms to resting-state functional connectivity MRI (rs-fcMRI) in order to parcellate mPFC into distinct areas at a finer grain. Such an analysis would provide an organizational foundation for future theories of mPFC function. It would also simplify reverse inference of activity in mPFC. In order to further elucidate the underlying function of the resulting sub-regions, I propose using a using NeuroSynth, a large-scale metaanalysis database, to reveal which key terms, and in turn functions, are most highly associated with each. Furthermore,, NeuroSynth can be used to look up publications which report activation in the different sub-regions, and they can be used to further inform an account of the function of each sub-region. Finally, I will write a review paper which attempts to describe the functional organization of mPFC as informed by the parcellation analysis.