Mapping Spatial Priority in the Human Frontoparietal Cortex

The prefrontal and posterior parietal cortices (PFC/PPC) sit at the apex of the sensorimotor hierarchy and are important for the selection and planning of voluntary action and are thought to bias the processing in sensory areas towards behaviorally relevant dimensions. Recently, several lines of evidence from a variety of disciplines have converged on a theory positing that activity in the frontal and parietal cortices constitutes maps of prioritized space. In this conceptual framework, priority maps tag important locations in the visual field and are constructed both from the salience (e.g., conspicuousness) of objects and its current relevance (e.g., task goal). Activity in a priority map could be used to select between competing representations of actions in the motor system or between competing representations of objects in the visual system. I will describe recent efforts in my lab to test whether patterns of neural activity in the human PFC and PPC are consistent with predictions from the priority map theory. Using novel topographic mapping techniques to identify candidate priority maps in PFC and PPC, we then perform a number of experiments to test hypotheses about the nature of what is being prioritized. In general, we find that sculpted activity in topographically organized maps of prioritized space in PFC and PPC could be read out to guide a variety of spatial cognitive behaviors.