1086-92-1419 **David K Hammond*** (hammond@uoregon.edu), NeuroInformatics Center, 5294 University of Oregon, Eugene, OR 97403. *Estimating cortical activity from EEG by spatiotemporal regularization exploiting anatomical connectivity and signal propagation delay.* Preliminary report.

Electroencephalography (EEG) data consist of voltages on the scalp surface generated by cortical current activity inside the brain. Estimating these cortical currents is a highly underdetermined inverse problem, and generally requires imposing some regularization by assuming prior knowledge about the cortical activity. A crucial property of the human brain is the pattern in which different cortical areas are connected to each other. Recent developments in diffusion weighted MRI imaging allow the non-invasive measurement of the white matter fibers forming these connections, enabling construction of a weighted graph representing brain connectivity. We describe using this so-called cortical connectome to construct a fully spatiotemporal regularization functional for source estimation of time-series EEG. This procedure involves lifting the spatial connectome graph to a spatiotemporal graph, with edges added in a manner modeling signal delays due to finite axonal propagation velocity. Regularization is given by penalizing sums of squares of differences across the spatiotemporal edges. We study solving the resulting variational problem by conjugate gradients, and compare against a related purely spatial approach which does not exploit temporal regularity. (Received September 21, 2012)