1077-92-2142 **David K Hammond*** (hammond@uoregon.edu), NeuroInformatics Center, 5294 University of Oregon, Eugene, OR 97403, and **Benoit Scherrer**. *Construction of prior models for EEG source estimation with weighted graph descriptions of anatomical brain connectivity.* Preliminary report.

The EEG source estimation problem consists of inferring cortical activation from measurements of electical potential taken on the scalp surface. This is an underdetermined inverse problem, and generally requires some form of regularization to yield a unique solution. Recent advances in diffusion weighted MRI technology allow non-invasive measurement of the brain connectome, a weighted graph indicating connectivity of different brain regions. In this work I will describe two different approaches for using the connectome graph to regularize the EEG source estimation problem. The first constructs a quadratic penalty on the cortical sources by taking the weighted sum of squares of differences across edges in the graph, yielding a linear source estimator we call cortical graph smoothing. In the second approach we use the spectral graph wavelet transform, a general method for defining wavelet transforms on weighted graphs, to construct a frame of "cortical graph wavelets" on the connectome graph. Assuming sparsity of the desired cortical sources in the cortical graph wavelet frame yields a convex ℓ_1-regularized least squares problem for the source coefficients. We demonstrate the improved effectiveness of both estimation approaches relative the standard minimum norm technique. (Received September 21, 2011)