1106-65-1711 **Sarah Orzlowski***, Department Mathematics, University of Siegen, Walter-Flex Straße 3, 57068 Siegen, Germany. *Reconstuction of electric currents in spherical geometries from magnetic field data via a regularized best basis algorithm.*

Brain activities can be described via electric signals, i.e. neuronal currents, which induce an electric potential on the scalp measured by electroencephalography and a magnetic field outside the head measured via magnetoencephalography. This problem is similar to problems in geomathematics.

The reconstruction of the neuronal currents from these sets of data is an ill-posed inverse problem, since the radial component of the current cannot be reconstructed. Hence, we decompose the current into suitable functions and analyze the null spaces of the associated operators.

It is now our aim to reconstruct and localize the electric currents in the brain by means of the decomposition and the novel regularized functional matching pursuit algorithm (RFMP), which has been used so far for tomographic inverse problems in geophysics. This algorithm needs an appropriate set of trial functions, the so-called dictionary, which we construct for the particular problem, a regularization term, and a regularization parameter, which has to be chosen wisely in order to obtain a suitable solution. With this algorithm, separate inversions of the EEG and MEG data are conducted primarily, followed by a joint inversion of both data sets. Some numerical results for a test case are demonstrated. (Received September 15, 2014)