1163-A5-750 **Briana Lynne Edwards*** (bedwards2016@my.fit.edu) and **Vladislav Bukshtynov** (vbukshtynov@fit.edu). *Multi-Sample PCA Applications for Reconstructing Structure of Biological Tissues.*

Electrical Impedance Tomography (EIT) is an evolving medical imaging technique with particularly promising applications for cancer detection. EIT-based screening is an attractive alternative to current detection methods because it is non-invasive and cost-effective. However, the underlying formula is a highly ill-posed nonlinear inverse problem requiring advanced computational algorithms to produce results that are competitive with existing screening methods. This work aims to increase the reliability and specificity of the computational framework to solve the inverse EIT problem by integrating multiple datasets into the principal component analysis (PCA) re-parameterization via multiple factor(ial) analysis (MFA). These datasets are represented by synthetically generated groups of samples, or solution images, related by their topology. An efficient solution space parameterization is facilitated by the multi-table PCA transformation constructed from properly combined sample groups. The efficacy of the PCA/MFA is maximized by setting the sample group weights and the number of PCA components as optimization parameters. Our first computational results obtained for multiple 2D synthetic models will be presented along with a discussion on future applications to 3D clinical data. (Received September 12, 2020)