OMICS J Radiol 2016, 6:5(Suppl)
http://dx.doi.org/10.4172/2167-7964.C1.010



## 3D MR imaging for navigational guidance: Correlation with MEG

**Glenn H Roberson**
The University of Alabama at Birmingham, USA

From November 2012 to October 2015, 163 patients at The University of Alabama at Birmingham (UAB) were studied with Functional Magnetic Resonance (fMR) & Diffusion Tensor Imaging for preoperative surgical planning or seizure disorder management. Presurgical planning included MR perfusion scans for regional blood flow analysis. 30+ of these had concurrent Magnetic Encephalographic (MEG) for eloquent speech lateralization. The processing of data was performed in a dedicated Brain Lab utilizing 3D analysis with a variety of 3D work stations. Images are then sent to the OR for navigation guidance. Comparisons of results, contributions and relative value of these modalities will be presented. Potential pit falls and errors are analyzed.

groberson@uabmc.edu

## Stain-free histopathology of cancer

**Haohua Tu**
University of Illinois at Urbana-Champaign, USA

Histopathology, whether visualizing microstructure or selectively labeling molecules with special stains, has a long history of development and maturation, and has been instrumental in biological or clinical laboratories for basic research and in hospitals for disease diagnosis/screening. To avoid the artifacts associated with sample freezing, fixation, and staining (labeling), we develop a nonlinear penta-model spectro-microscopy to critically complement or potentially eliminate stained histology and histopathology. This technique requires a shift of focus from manipulating matter (the biological sample) to instead manipulating the optical waves (via customized excitation and signal detection) in order to generate molecular contrast. Instead of using the exogenous labeling agents in conventional optical microscopy to "physically" (invasively) label the chemical substances of interest; we initiate the use of rapidly switchable light excitation/detection channels to virtually "label" these chemical substances. Thus, the biological sample can be visualized in its physiologically authentic condition without sacrificing either molecular specificity or high spatial resolution. This technique is implemented in a programmable microscope requiring minimum optical realignment, so that a biologist or pathologist with no laser training can in the future selectively display a specific endogenous molecule (or molecular structure) on the computer screen by programming the excitation, or instantly compare the displayed molecule distribution with a different one by reprogramming the excitation. Using breast cancer as a prototypical application, we have imaged the well-known events in tumor microenvironment, including angiogenesis, lymphangiogenesis, extracellular matrix remodeling, non-native cell recruitment, extracellular vesicle up-production and switched metabolism toward biosynthesis. This allows us to identify early and quantifiable biomarkers in breast cancer development.

htu@illinois.edu