

## Neurology

# Multi-Frequency Encoded Source Imaging

### Brief Description of Technology

A new imaging technology to localize and visualize electrical and/or magnetic signals in two or more frequency ranges.

#### TECHNOLOGY ID

2017-0602

#### COMPLEMENTARY TECHNOLOGY

2013-0808

#### BUSINESS OPPORTUNITY

Exclusive License

#### PATENT INFORMATION

Provisional Filed

#### LEARN MORE

Innovation Ventures  
partnering@cchmc.org  
1.513.636.4285

innovation.cincinnatichildrens.org

### Technology Overview

Conventional single frequency brain scans are used to diagnose epilepsy by sampling and recording brain wave activity in the range of 1-70 Hz. Modern EEG technology is capable of sampling greater frequency ranges; however, complex noise-reduction and gain amplification is required to isolate real brain waves from environmental noise. Cincinnati Children's researchers have created a step-wise approach to isolation and anatomical display of brainwave activity that involves filtering low frequency waves, binning frequency groups, then localizing activity using MEG. The result is an anatomical map of brain wave and seizure activity. This method is superior to traditional EEG in that it provides much more subtle and detailed brain activity data; as well as, anatomically mapping of data to the brain.

### Applications

Currently useful for diagnosis and grading of epilepsy with future goals to seek FDA approval for anatomical localization of seizure activity for neurosurgical planning.

### Advantages

Provides seizure location information as well as other abnormalities in brain activity that do not meet seizure criteria but could be clinically important. These abnormalities are invisible using traditional EEG methods.

### Market Overview

There are an estimated 150K new cases of epilepsy each year. EEGs, while a gold standard for diagnosing epilepsy, have limitations. It has been shown that interictal epileptiform discharges are only found in 20-55% of persons with epilepsy on a first "routine" EEG. The percentage goes up to 80 to 90% only when four or more EEGs are obtained.

### Investigator Overview

Jing Xiang, MD, PhD, Director MEG Research, Division of Neurology