

# Implantable Device to Treat Epilepsy

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## Technology description

Diagnostic and preventative implantable device with computer-brain interface for treatment of epilepsy.

### Problem

One percent of the world's population suffers from epilepsy. Aside from seizures' debilitating effects, patients are confined by their unpredictability. Prevention is one way to decrease seizures but measures usually focus on only a single parameter such as high-frequency oscillations (see above figure). Drug treatment or surgery is used to curb seizures. Implantable devices that detect and administer drugs are increasingly sought out as treatment options for epilepsy. However, these devices are limited; they only activate at the start of a seizure and deliver a uniform dose regardless of the seizure's severity, which result in a delay in treatment or overmedication.

### Solution

To address the limitations of these devices, the Litt lab combined a closed responsive system with an implantable device that uses multi-level, closed loops. One system identifies and maps epileptic networks. Another predicts epileptic seizure onsets. A third system allows the device to distinguish seizure severity to deliver the appropriate dosage and adjust other treatment parameters. Lastly, another system incorporates these inputs to optimize and adjust the device parameters and therapeutic dose. electrical signals from neural grooves. The data is collected rapidly and is of high spatial and temporal resolution. Use of biologically compatible components for the device ensures long term stability and safety.

- [Brian Litt on Brain-Computer Interfaces](#)
- [Brian Litt - Flexible, Active Brain-Computer Interfaces for Epilepsy](#)
- D' Alessandro et al. [Clin Neurophysiol, 2005, 116\(3\) - 506.](#)
- Gardner et al. [Clin Neurophysiol, 2007, 118\(5\) - 1134.](#)
- Blanco et al. [Brain, 2011, 134 \(Pt 10\) - 2948.](#)
- Wulsin et al. [J Neural Eng, 2011, 8\(3\) - 036015.](#)

## Advantages

- Combines multiple features through machine learning algorithms
- Anticipates and treats mild brain disturbances; prevents more severe seizures that require larger drug doses

- Map, monitor and manage epileptic network

## Institution

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