



# Synchronized Multi-Modal Tinnitus Therapy (20120070, Dr. Hubert Lim)

**A non-invasive or minimally-invasive method for the suppression of tinnitus using synchronized brain stimulation.**

**IP Status:** Issued US Patent; **Application #:** 14/395,034

## Synchronized brain stimulation as a potential tinnitus cure

Prof. Lim at the University of Minnesota has developed a new method to suppress and potentially cure tinnitus using synchronized multi-modal stimulation of the brain. The technology consists of algorithms and devices that non-invasively or transcutaneously stimulate auditory and non-auditory pathways in a highly synchronized fashion. The technique stems from the hypothesis that tinnitus patients who experience abnormal brain representations continue to retain the normal (original) brain representations; and, by “shocking” specific regions of the brain, the brain can be switched back to the normal representation. Using highly synchronized multi-modal stimulation of specific regions in the brain, this technology acts as a “neural switch” that can switch neural activity to suppress tinnitus and phantom limb pain.

## Neural switch therapy shocks brain back to normal state

Tinnitus, the perception of sound with no external source, affects 15-20% of the population and currently has no cure. Existing therapies include medications, using masking noises, or simply retraining the brain using individually programmed tonal music. While these methods ease tinnitus to a certain degree, they do not address the underlying cause. The technology disclosed here, on the other hand, induces a strong synchronous shock to specific regions of the brain to reset it from an abnormal state back to the normal state. Owing to such novel method of action, this non-invasive treatment technology has the potential to successfully switch the firing pattern of tinnitus-affected neurons to suppress and cure tinnitus and phantom limb pain.

## Phase of Development

- Prototype developed. Animal testing in progress.

## Key Benefits & Differentiators

- **Non-invasive** electrode stimulation avoids surgery, infection, and reduce the cost of administration
- Focused on **addressing the underlying cause** rather than simply reducing the symptoms
- Medication-free treatment
- Synchronous multimodal stimulation to achieve maximum optimized ‘shock’ to switch neural activities
- May treat other neurological disorders

## Applications

## Technology ID

20120070

## Category

Engineering & Physical Sciences/Instrumentation, Sensors & Controls  
Life Sciences/Human Health  
Life Sciences/Medical Devices  
Life Sciences/Neuroscience  
Software & IT/Algorithms  
Agriculture & Veterinary/Veterinary Medicine

## Learn more



- Tinnitus treatment
- Phantom limb pain
- Neurology/audiology/ENT
- Neurological disorders involving abnormal brain plasticity

#### **Researchers**

Hubert Lim, PhD

*Associate Professor, Biomedical Engineering*

[External Link](http://bme.umn.edu) (bme.umn.edu)

#### **Publications**

[\*A new concept for noninvasive tinnitus treatment utilizing multimodal pathways\*](#)

*Conf Proc IEEE Eng Med Biol Soc. 2013;2013:3122-5*

[\*Investigating a new neuromodulation treatment for brain disorders using synchronized activation of multimodal pathways\*](#)

*Scientific Reports volume 5, Article number: 9462 (2015)*

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