



# Multimodal Synchronization, Sound & Electrical Stimulation, Hearing Aid (mSync-hEAR)

**IP Status:** Issued US Patent; **Application #:** 15/616,278

## Enhanced, Noninvasive Treatment of Hearing Disorders

The technology is a hearing aid device with an integrated electrical stimulator to use for enhanced hearing rehabilitation. Electrodes are attached to different parts of the ear to provide precisely-timed electrical stimulations relative to acoustic signals transmitted from the hearing aid. Application of synchronized acoustic and electrical stimulation is used to suppress or enhance activity in the auditory system. The suppression of neural activity can be used for the treatment of hearing conditions such as Tinnitus and hyperacusis. This device can also be used to enhance hearing aid effectiveness.

## Multimodal Stimulation for Auditory Neural Activity Correction

Combining electrical stimulation of the ear region with precise timing relative to the sound input can alter activity in the auditory system. Based on the nature and time of electrical stimuli, the activity in the auditory system can either be enhanced or suppressed. The device features the ability to modify these signal parameters in real-time, enabling the user to change the sensitivity towards certain sound signals on the go. This multimodal synchronization therapeutic device can be used to enhance hearing rehabilitation, balance hearing across different energy ranges, and suppress other hearing ailments. The device features a wireless module that can be used to power and control the device remotely.

## Phase of Development

Proof of concept tested in animals.

## Benefits

- Enhanced hearing rehabilitation - quicker recovery
- Non-invasive; no surgical implants needed
- Can be used as normal hearing-aid
- Minimal modification from a typical hearing-aid
- Wireless: no dangling wires/attachments
- Simple plug and use

## Features

- Electrical stimulator for multiple ear regions
- Enhancement and suppression of neural activity from a single device
- Real-time modification to change sensitivity
- Wireless powering and communication with hearing aid

## Applications

## Technology ID

20160094

## Category

Engineering & Physical Sciences/Instrumentation, Sensors & Controls  
Life Sciences/Human Health  
Life Sciences/Medical Devices  
Life Sciences/Neuroscience  
Software & IT/Algorithms  
Software & IT/Communications & Networking

## Learn more



- Neuromodulation
- Treatment of Tinnitus and hyperacusis
- Improve effectiveness of hearing aids
- Enhance plasticity of the auditory system for quicker rehabilitation
- Improved hearing performance at target frequencies

### **Researchers**

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

### **Publications**

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

*Scientific reports 5 (2015): 9462*

### **Ready for Licensing**

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