



CASE WESTERN RESERVE
UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

Department of Psychological Sciences

Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7123

Phone 216-368-2686
Fax 216-368-4891

February 9, 2017

Nord Grant Application Committee
UCITE Case Western Reserve University
Cleveland, OH 44106

Dear Committee Members:

Nord grant funds are being requested to purchase a hearing loss-hearing aid-cochlear implant simulator system for student education. The system, *Immersive Hearing Loss and Prosthesis Simulator (I-HeLPS)*, is a signal processing system that allows the end user to experience what it sounds like to have a hearing loss and to also experience the benefit of using a hearing aid or a cochlear implant.

Statement of Purpose

It is estimated that 20% of the US population is affected by some type/degree of hearing loss. Hearing loss is a significant health concern, often being cited as the third most common physical condition behind heart disease and arthritis. Hearing loss can affect people of any age. When people experience hearing loss, typically two problems occur. First, many sounds become inaudible. That is, the intensity level of a sound typically needs to be raised for the person to hear a sound. Second, not only do sounds become harder to detect, but clarity is also impaired as the fidelity of the incoming sound decreases. Therefore, even when a sound is detectable (or made louder) it still may be hard to understand due to a decrease in clarity.

A hearing aid is an assistive listening device designed to restore audibility to a listener so that they can hear sounds that are softer than their hearing threshold and to improve the clarity of the sounds that they are listening to. A cochlear implant is a device that is typically used with more severe degrees of hearing loss or deafness. A cochlear implant is a surgically implanted device that provides electrical input to the inner ear to directly stimulate the eighth (auditory) cranial nerve. Both hearing aids and cochlear implants provide profound benefit to those who are hard-of-hearing and/or deaf. However, a misconception is that these devices restore hearing. *They do not.* What a person hears when using a hearing aid and/or a cochlear implant is not the same as what is heard by a person with normal hearing ability.

The I-HeLPS signal processing system is a wearable device that allows people to experience what it is like to have a hearing loss and to also experience what it is like to have a hearing loss while wearing a hearing aid or cochlear implant. The system is able to process incoming sounds in real-time.

Many media and marketing sources have unjustly portrayed cochlear implants as a “cure” for deafness and severe hearing loss. Some advertising has gone as far as to state that, “cochlear implants take a deaf child who can’t hear and turns them into a typical child that doesn’t listen”. Cochlear implant technology is fabulous. It allows an individual who had potentially no auditory input to have the potential to learn speech and language, and communicate in a hearing world. *However, it does not restore normal hearing processes.* Using a cochlear implant simulator allows a student to understand how difficult and tiring it is to hear when someone has a hearing loss or when listening through a cochlear implant. Having this experience is expected to not only increase the student’s interest in communication disorders, but also to teach empathy.

Expected Education/Student Impact and Outcome Measurement Plan

The I-HeLPS simulator will be used as an instructional tool for COSI 321 *Speech and Hearing Science* and COSI 370 *Introduction to Audiology*, which I regularly teach. Both of these courses are required for communication sciences majors. We will also be able to use the I-HeLPS system at recruitment events in which students who might be interested or curious about communication sciences and disorders will have a hands-on experience trying to communicate effectively without the use of a “normal” auditory system. During my graduate program the company that developed I-HeLPS built the first prototype of these headphones. I can still remember the feeling of helplessness I experienced when I was staring right at the people in front of me and watching them talk. I could hear the sounds coming out of their mouth, but I was unable to understand what they were saying. It was the first time I actually was able to “hear” what it is like to have a hearing loss. It would be wonderful to provide this experience to our students studying communication disorders at CWRU.

As an experiential tool, the I-HeLPS system will be used during COSI 370 – Introduction to Audiology. During the class each student will have the opportunity to use the headset for one lecture. They will be required to write a reaction paper in response to the experience they had while wearing the headset. This reaction paper will be followed by a survey after the assignment is completed to document outcomes. These data will be provided to the UCITE office.

Lastly, our laboratory participates in a local middle school STEM program. We will use the I-HeLPS system with participating students with the intention of sparking their excitement not only about science, in general, but hearing science at CWRU. A survey will be given to the students after the completion of this opportunity. In addition, we will have the opportunity to track these students over time. The longitudinal data will allow us to measure the lasting impact of this exercise with students well beyond the date of the actual experience.

Professional Impact

Over the past year and a half, I have been incorporating new and experiential learning tools in the classroom. If funds are available for travel, I anticipate presenting the new pedagogical methods I have been using, including those described above, at a national conference to share these tools and ideas with other faculty in communication sciences and disorders.

At this time department funds are not available to support this purchase. Thank you for your consideration and the opportunity to apply for these funds.

Sincerely,



Lauren Calandruccio, Ph.D.
Assistant Professor



Lee Anne Thompson, Ph.D.
Professor and Chair

Item	Cost
I-HeLPS	\$1,200
Host Computer Requirement	\$800
Grand Total Requested	\$2,000

Previous Nord Funding Awarded Fall 2015	Audiology Teaching Tools \$920
--	-----------------------------------

Budget approved by Lee Thompson, Professor and Chair



10/24/2016