Describe your research need and the technology specialties involved. How critical is this project to your company? What level of privacy/secrecy is required? May we include your company name in our outreach within the Ohio Research University network?

**Research Need:** When hearing loss develops, patients often lose their ability to distinguish high-frequency sounds, such as t- or s-sounds, which are crucial for speech recognition. Many individuals however retain some normal low-frequency hearing corresponding to the apex of the cochlea (Hume et al., 2005). Even with minimally invasive cochlear implants, there is still a risk for damaging the remaining functioning (low-frequency) cochlea. There has been progress in preserving residual hearing of patients receiving cochlear implants through use of shorter cochlear implants, revised implantation techniques and electroacoustic (EAS) or hybrid stimulation of the same ear with both acoustic and electrical stimuli (Gantz et al., 2003; Gstoettner et al., 2004; Woodson et al., 2010). In this configuration, a shortened, minimally traumatic, cochlear implant electrode array is inserted into the basal cochlea to stimulate the high-frequency region, while a conventional acoustic hearing aid is used to deliver amplified acoustic stimulation. The combination of residual low-frequency hearing and high-frequency electrical stimulation via cochlear implants has yielded improvement in auditory performance (Irving et al., 2014; Talbot et al., 2008; Turner et al., 2012, Roland et al., 2016). Despite these encouraging results, about a third of patients eventually lose hearing in the implanted ear (Barbara et al., 2003; Gstoettner et al., 2006; Woodson et al., 2010). Therefore a solution that addresses problems with present devices which require an external apparatus, often poor sound and language reproduction and are cosmetically unacceptable would be an advantage over the present state-of-the-art.

This project would be a differentiator for our company as there is no other method, device, substance or procedure that is totally implantable, self-sustainable and cosmetically acceptable currently available on the market.

We envision an appropriate level of secrecy that protects any generated intellectual property. Standard NDA is in order. Our company name can be included in any outreach efforts.

What are your goals and objectives for the project? What deliverables do you envision? Please be specific.

**The ultimate objective of this research project (phase 3) is to develop a method, technique, substance, device or combination of all four which would restore hearing in patients with a specific pattern of mild to moderate nerve deafness. This method would be a minimally invasive procedure performed through the ear canal and would involve replacing only the non-functioning portion of the inner ear while preserving all the normally functioning auditory structures.**

**The intermediate objective of this research project (Phase2) is to develop a model for this method. The model would test the concept and serve as a blueprint, template and/or formula for the method. The model would create the intellectual property which could then be licensed to an entity that**
would further develop the method, oversee the required animal and human testing and bring the final product to market.

The immediate objective of this research project (Phase 1) is to identify and create the team which will develop the model. Members of this team will be invited to join based upon their ability and interest in providing answers to the following two questions:

1) What are the specific cochlear defects which cause this specific type and pattern of nerve deafness?
2) How can these specific defects be remedied by using current knowledge in nano/micro science, bio-mechanics and bio-chemistry, genetic engineering and/or other related fields?

Deliverables for Phase 1 are:
1) A comprehensive review of current publications, patents, grants, etc. in the field
2) A comprehensive review of leading institutions, researchers, grant holders, companies, collaborators and research entities in the field
3) Identification of existing and potential emerging growth technologies in the field
4) Identification of individuals and/or institutions that would be interested and qualified to become a member of the research team
5) Development of a budget for the project and identification of possible funding sources

What date do you need the research successfully completed by?

3/1/2019

What is your budget for this project? If RFI, indicated anticipated budget, if known.

To be determined

Describe any in-kind support you envision being made available. Examples in-kind support include contribution of goods, services or facilities such as raw materials, unique testing, analysis, and/or processing equipment, use of specialized (i.e. environmental, structural, electrical, etc.) test facilities, or use of research/engineering personnel.

None.
Please signoff below indicating your understanding that:

1. If a budget amount was entered above it represents your committed financial support for any resulting project out of this opportunity AND you understand that financial support is the full responsibility of your organization. Further, you understand final proposed project costs may be higher or lower from responding Universities.

2. If no budget amount (or an estimate) is entered, representing a Request for Information (RFI) Opportunity, any eventual project funding is governed by the above as well.

3. No OFRN funding, grant, or in-kind monies are offered to defray the financial costs of this opportunity, unless specifically discussed and documented.

4. As each University has their own approach to Intellectual Property, IP rights/assignments will be negotiated directly with the university, should this project move forward into contracting. Note that Ohio Revised Code 3345.14 (http://codes.ohio.gov/orc/3345.14), will govern these conversations.

Organization: Universal Technology Corporation
Requestor: Robert Goldenberg, MD
Date: 10/19/17