

**AIAD #10853**

**Research Opportunity:** Cadet

**ORGANIZATION/PROJECT SPONSOR**

**Organization:** Human Research & Engineering Directorate, Soldier Performance Division

**Organization POC:** Phuong Tran

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**Location of Sponsoring Directorate or Division (City, State):** Aberdeen Proving Ground, MD

**PROJECT**

**Title:** Bone Conduction (BC) technology for radio communication research:

The effect of bone vibrator's static force on hearing threshold

**Description:** BC vibrators deliver the sound to the listener's ears through skull vibration from virtually anywhere on the head; leave the ear canals open for auditory situation awareness. BC microphones also have a better signal to background noise ratio compared to conventional air conduction microphones. BC transducers also can be inconspicuous under headgear and they are compatible with any hearing protection device. These features of BC technology are operationally important for Dismounted Infantry, Special Operations Forces and security personnel. Since BC technology for speech communication is a relatively new application there is great opportunity for research from psychoacoustics and human factors engineering perspectives to improve transducers' design including techniques for calibration, determining effects of transducers' location, static force, mounting system, BC transducer design, speech intelligibility and comfort evaluation. Thus, there are many projects where a faculty/cadet can be involved.

Specifically, this project involves comparing a user's ability to detect sound from a BC transducer as the static force of the transducer is varied. Static force is the pressure applied to the transducer as it contacts the skin on the listener's head. Minimal static force results in an ineffective transfer of energy and excessive force is uncomfortable. The goal is to determine the range of pressures suitable for reliable communications while not annoying the user.

**ARL/Army Benefit:**

Create research opportunity for USMA cadets, increase awareness about capabilities of BC technology, and contribute to better understanding for further development of this new communication interfaces.

**Background Required:** Statistics

**Security clearance required:** What level of clearance is required (None, Secret, or Top Secret)?  
None

**Capacity:** (maximum number of faculty/cadets you would like working on this project) two

**Duration:** (# of weeks) at least 3-4 weeks

**Block Preference:** Please specify what timeframes DO NOT WORK for the organization (23  
May – 8 August): None