Research and Creative Grant Competition  
2013 Funded Projects

**Changing Ice, Changing Public: Evaluating Glacial Repeat Photography as an Education Tool**  
Matthew Brownlee, PhD  
Parks, Recreation and Tourism

Evaluating and increasing the efficacy of climate change education is important because despite overwhelming evidence of climate change, the U.S. public remains skeptical and uninformed about the topic. Recently, climate change educators have been using Glacial Repeat Photography (GRP) to increase public awareness. During GRP a scientist photographer couples a past photograph (1930s) of a glacier with a recent picture that displays the glacier’s diminished stature. Climate change educators combine these paired photographs with environmental interpretation to increase public understanding of climate change. Although widely adopted, the efficacy of GRP as an educational approach has not been evaluated. This project will develop an evaluative process to identify the long-term impact and effective pedagogical processes used in GRP. The investigators will use a quasi-experimental design focusing on a quantitative questionnaire administered to GRP viewers \((n = 2,000)\). Researchers will manipulate four elements of the GRP experience and viewers will be assigned to one of four treatment groups. Researchers will use multivariate approaches to identify the relationships between treatment, control, and dependent variables. Although these investigative techniques are not new, they have not been applied to the GRP experience, and thus represent a novel application. Since the GRP approach is informed and adopted by multiple disciplines (e.g., education, geology, communication studies), this project will influence how researchers and agencies conceptualize, facilitate, and evaluate the GRP viewing experience. The investigators specifically designed this project to use the developed methods and results to leverage extramural funding from the U.S. National Park Service.

**Determining the influence of the medial olivocochlear reflex on speech perception in noisy environments**  
Skyler Jennings, PhD  
Communication Sciences and Disorders

Individuals with normal hearing have an exceptional ability to understand speech in a noisy environment. This ability may be facilitated by an auditory reflex called the medial olivocochlear reflex. The primary function of this reflex is to adjust the response of the inner ear shortly after an individual moves to a new acoustic environment. For example, as an individual moves from a quiet room to a noisy restaurant, the reflex “primes” the auditory system for optimal performance in the new environment. One way that the reflex may improve performance is by enhancing the contrast between the energy peaks and dips that occur in speech. The proposed experiment tests this by producing energy fluctuations (i.e. peaks and dips) in a noise stimulus and then asking human subjects to detect these fluctuations for various stimulus manipulations. The results of this perceptual task will be predicted using an auditory model that is adjusted to simulate the medial olivocochlear reflex. The approach of combining perceptual and modeling experiments is a powerful method for linking perception to underlying physiological mechanisms. Such a link is essential for understanding why hearing-impaired listeners struggle to understand speech in noisy environments, even when wearing the best hearing devices (i.e. hearing aids and cochlear implants). The outcomes of the proposed research are: 1) provide a diagnostic method for assessing the integrity of the medial olivocochlear reflex and 2) provide guidelines for algorithms in hearing devices that attempt to compensate for a dysfunctional reflex in individuals with hearing loss.
Injuries among dancers are common due to the strenuous nature of dance (Ojofeitimi & Bronner, 2011). Unfortunately, injured dancers face the inability to use excessive training as a means for maintaining an “ideal” body which may increase susceptibility to disordered eating behaviors for preserving a desired physique. The purpose of this study is to explore relationships between injury, body dissatisfaction, and disordered eating attitudes/behaviors among dancers. Examining these relationships is important as clinical eating disorders result in numerous health complications such as gastrointestinal difficulties (e.g., constipation), menstrual dysfunction, cardiovascular changes (e.g., low blood pressure), and decreased bone mineral density (Beals, 2004). In fact, eating disorders have recently been prioritized by the National Institute of Mental Health (NIMH) which recognizes the health consequences and high mortality rates among those with disordered eating. In order to explore relationships of interest, 40 currently injured female dancers from the University of Utah and from professional companies within the greater Salt Lake County will be recruited for participation in this qualitative study. In an effort to triangulate dancer perspectives, 10 company directors, dance instructors and/or choreographers will also be recruited for interviewing. Inductive content analysis will be used to analyze the data. Validity checks will be employed using established “trustworthiness” procedures. Upon study completion, we will seek NIMH R03 funding (R03: http://grants.nih.gov/grants/guide/pa-files/PA-11-262.html) to implement and evaluate an educational program for injured dancers. Various educational programs have demonstrated efficacy in mitigating the deleterious effects of eating disorders among high performance individuals (e.g., Reel et al. 2011).

Dietary anthocyanins for the prevention of vascular disease in diabetes
Anandh Babu Pon Velayutham, PhD Nutrition

Diabetes mellitus greatly increases the risk cardiovascular diseases (CVD) such as atherosclerosis, which accounts for the largest number of all deaths (over 65%) among diabetic patients. Hyperglycemia-induced vascular inflammation is a key event in the pathogenesis of atherosclerosis. The morbidity and mortality associated with diabetic vascular disease could be prevented by compounds that reduce vascular inflammation, and dietary flavonoids are promising anti-inflammatory candidates. Flavonoids represent a large class of phenolic compounds found in fruits, vegetables, cocoa, tea, soy, and red wine. Recently we have demonstrated the vascular protective effects of green tea and soy flavonoids. While these studies are exciting, studies on other important dietary flavonoids such as anthocyanins are limited. Anthocyanins are widely available in the human diet in fruits, vegetables and red wine. Bilberries and blackcurrants have highest level of anthocyanins and consumption of these fruits was shown to reduce inflammatory molecules in humans. In addition, flavonoid rich grape seed extract (GSE) supplementation reduces blood pressure in humans. However, the protective role of these compounds against diabetic vascular disease has not been investigated. Importantly, studies on these extracts, rather than the isolated components such as anthocyanins, may yield valuable information about the cardioprotective role of the whole fruits. In this proposed study we will determine whether (i) bilberry fruit extract (BFE), (ii) black current fruit extract (BCFE), and (iii) GSE have the potential to reduce high glucose induced endothelial inflammation. We hypothesize that BFE/BCFE/GSE will attenuate high glucose induced endothelial inflammation in human vascular EC.