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<tr>
<th>Time</th>
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<tr>
<td>7:00 AM - 5:30 PM</td>
<td>Registration and information desk open</td>
<td>Lobby II Foyer</td>
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<tr>
<td>7:00 AM - 8:00 AM</td>
<td>Continental Breakfast</td>
<td>Grand Bay Ballroom South</td>
</tr>
<tr>
<td>8:00 AM - 8:15 AM</td>
<td>Welcome and opening remarks</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>9:30 AM - 9:50 AM</td>
<td>“Implications If Your Life Depends On Your Hearing: The NRR vs the ASAF”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td>9:50 AM - 10:20 AM</td>
<td>BREAK</td>
<td>Grand Bay Ballroom South</td>
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<tr>
<td>11:15 AM - 11:35 AM</td>
<td>“Method for Extending OSHA Age Correction Tables Beyond Age 60”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>11:35 AM - 12:05 PM</td>
<td>NHCA Business Meeting</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>12:05 PM - 1:20 PM</td>
<td>Networking Luncheon</td>
<td>Grand Bay Ballroom North</td>
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<tr>
<td>1:30 PM - 1:50 PM</td>
<td>“Getting It Right (More Often)”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>1:50 PM - 2:10 PM</td>
<td>“The US Navy’s Noise Induced Hearing Loss Program”</td>
<td>St. Petersburg Ballroom I, II, III</td>
</tr>
<tr>
<td>2:10 PM - 2:30 PM</td>
<td>“The Variability of Pure Tone Threshold Measurements”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>2:30 PM - 2:50 PM</td>
<td>“Evaluating the Operational Impact of Hearing Impairment”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>2:50 PM - 3:10 PM</td>
<td>“Noise Induced Hearing Loss and the Working-Age Adult - A Personal Story”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td>3:10 PM - 3:40 PM</td>
<td>BREAK</td>
<td>Grand Bay Ballroom South</td>
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<tr>
<td>3:40 PM - 4:00 PM</td>
<td>“Can You Hear Me Now? The Challenge of Determining Whether Workplace Noise Is Increasing or Decreasing Over Time”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>4:00 PM - 4:20 PM</td>
<td>“Prevalence of Workers with Shifts in Hearing by Industry: A Comparison of Occupational Noise Exposure Regulation Criteria”</td>
<td>St. Petersburg Ballroom I, II, III</td>
</tr>
<tr>
<td>4:20 PM - 4:40 PM</td>
<td>“Effectiveness of Interventions to Prevent Occupational Noise-Induced Hearing Loss, Update of a Cochrane Systematic Review”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<tr>
<td>5:25 PM - 6:30 PM</td>
<td>Break/Posters/Committee Meetings/Networking Time</td>
<td>Pool Area (Subject to change)</td>
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<tr>
<td>5:25 PM - 6:30 PM</td>
<td>Student Meet &amp; Greet (Students ONLY)</td>
<td>(Students ONLY)</td>
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<tr>
<td>6:30 PM - 9:30 PM</td>
<td>Friday Night Off-Site Event</td>
<td>Dali Museum</td>
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<tr>
<td>Breakout #1 - Music</td>
<td>Breakout #2 - Prevention/Education</td>
<td>Breakout #3 - Military</td>
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<tr>
<td><strong>St. Petersburg I</strong></td>
<td><strong>St. Petersburg II</strong></td>
<td><strong>St. Petersburg III</strong></td>
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<tr>
<td><strong>9:00 AM - 9:20 AM</strong></td>
<td><strong>9:00 AM - 9:20 AM</strong></td>
<td><strong>9:00 AM - 9:20 AM</strong></td>
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<tr>
<td>Kris Chesky, Ph.D. - University of North Texas</td>
<td>Elizabeth Beach, Ph.D. - National Acoustic Laboratories</td>
<td>Virginia Bailey, CPT, Au.D., M.B.A., M.S. - Fort Jackson Army Hearing Program</td>
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<tr>
<td>“Clinical Verification of Custom-Fitted Musician Earplugs: How Much Deviation from ‘Flat’ is Acceptable?”</td>
<td>“Effectiveness of a Brazilian Version of the ‘Dangerous Decibels’ Educational Program”</td>
<td>“Pharmacologic Protection from Noise Induced Hearing Loss (NIHL) in the US Military”</td>
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<tr>
<td>Brian Fligor, Sc.D. - Boston Children’s Hospital</td>
<td>Kella Knobel, Ph.D. - University of Campinas</td>
<td>Kathleen Campbell, Ph.D. - University of Southern Illinois Medical Center</td>
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<td><strong>9:40 AM - 10:00 AM</strong></td>
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<tr>
<td>“Effects of Recreational Noise on Otoacoustic Emissions and High Frequency Thresholds”</td>
<td>“DiscovEARty Zone: Hearing Conservation Outreach from the American Academy of Audiology”</td>
<td>“Hearing Protection Device Field Attenuation Estimation System Round Robin Results”</td>
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<tr>
<td>Colleen, LePrell, Ph.D. - University of Florida</td>
<td>Sharon Sandridge, Ph.D. - Cleveland Clinic</td>
<td>JR Stefanson, B.S., C.O.H.C. - United States Army Aeromedical Research Laboratory (GDIT)</td>
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**10:00 AM - 10:30 AM | BREAK (Grand Bay Ballroom South)**

| **10:30 AM - 10:50 AM** | **10:30 AM - 10:50 AM** | **10:30 AM - 10:50 AM** | **10:30 AM - 10:50 AM** |
| Mead Kiljon, Ph.D. - Eymotic Research, Northwestern University | William Murphy, Ph.D. - NIOSH | Jeffrey Komrower - Noise Control Engineering, Inc. | Edward Hayes - Clarkson University |

| **10:50 AM - 11:10 AM** | **10:50 AM - 11:10 AM** | **10:50 AM - 11:10 AM** | **10:50 AM - 11:10 AM** |

<p>| <strong>11:10 AM - 11:30 AM</strong> | <strong>11:10 AM - 11:30 AM</strong> | <strong>11:10 AM - 11:30 AM</strong> | <strong>11:10 AM - 11:30 AM</strong> |
| “Sound Exposure of Professional Orchestral Musicians During Solitary Practice” | “Auditory Risk Estimates for Youth Target Shooting” | “Human Aural NON-Detectability” | “Replacing Cells in the Inner Ear: The Path to a Regenerative Cure for Hearing Loss” |
| Ian O’Brien - University of Sydney | Deanna Meinke, Ph.D. - University of Northern Colorado | Kichol Lee, Ph.D. - Virginia Tech | Andrea Boidman, Executive Director - Hearing Health Foundation |</p>
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<th>Time</th>
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<tbody>
<tr>
<td>11:30 AM - 12:45 PM</td>
<td>Hosted Luncheon and Awards</td>
<td>Grand Bay Ballroom North</td>
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<tr>
<td>12:45 PM - 12:55 PM</td>
<td>Award Photos</td>
<td>Grand Bay Ballroom North</td>
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<td></td>
<td>Thais Morata, Ph.D. - National Institute for Occupational Safety and Health</td>
<td>USA</td>
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<tr>
<td>1:40 PM - 2:00 PM</td>
<td>“85/3 and Other Items for OSHA’s To-Do List”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td></td>
<td>Alice Suter, Ph.D. - Alice Suter and Associates</td>
<td>USA</td>
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<tr>
<td>2:00 PM - 2:20 PM</td>
<td>“Management Issues Related to Hearing Conservation in Music &amp; Entertainment”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td></td>
<td>Robert Ghent, Au.D. - Honeywell Safety Products</td>
<td>USA</td>
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<tr>
<td>2:20 PM - 2:50 PM</td>
<td>BREAK</td>
<td>Lobby II Foyer</td>
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<tr>
<td>2:50 PM - 3:10 PM</td>
<td>“Recommended Auditory Processing Test Battery for Workers with Occupational Exposures to Ototoxins”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td>Vishakha Rawool, Ph.D., CCC-A - West Virginia University</td>
<td>USA</td>
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<tr>
<td>3:10 PM - 3:30 PM</td>
<td>“Auditory Dysfunction Associated with Solvent Exposure”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td>Adrian Fuente, Ph.D. - University of Chile</td>
<td>Chile</td>
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<tr>
<td>3:30 PM - 3:50 PM</td>
<td>“Tinnitus”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td></td>
<td>Edward Lobarinas, Ph.D. - University of Florida</td>
<td>USA</td>
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<tr>
<td>3:50 PM - 4:10 PM</td>
<td>“Healthy Diet = Healthy Ears?”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td></td>
<td>Christopher Spankovich, Au.D., Ph.D., M.P.H. - University of Florida</td>
<td>USA</td>
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<tr>
<td>4:10 PM - 4:30 PM</td>
<td>“Development of a Task-Based Noise Constraints Flight Rule for the International Space Station”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td>Richard Danielson, Ph.D. - Baylor College of Medicine</td>
<td>USA</td>
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<tr>
<td>4:30 PM - 4:50 PM</td>
<td>“A Comparative Study of Changes in Firefighters Occupational Exposure to Noise”</td>
<td>St. Petersburg Ballroom I, II, III</td>
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<td></td>
<td>Catherine Fitzgerald - University of Alabama at Birmingham</td>
<td>USA</td>
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<td>4:50 PM - 5:00 PM</td>
<td>Closing Remarks</td>
<td>St. Petersburg Ballroom I, II, III</td>
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**Exhibits Open 7:45 AM to 12:00 PM**

**Grand Bay Ballroom South**

**2014 Workshop Submissions**
Deadline: July 1, 2013

**2014 Panel/Poster Submissions**
Deadline: July 31, 2013

Submit at: [www.hearingconservation.org](http://www.hearingconservation.org)
Available beginning April 2013
FRIDAY CONFERENCE PRESENTATION DESCRIPTIONS

Friday, February 22, 2013

Platform Presentation Descriptions

7:00 AM - 5:30 PM  Registration and Information Desk Open | Lobby II Foyer

7:00 AM - 8:00 PM  Continental Breakfast | Grand Bay Ballroom South

8:00 AM - 8:15 PM  Welcome and Opening Remarks | Laura Kauth and Nancy Galliugh | St. Petersburg Ballroom I, II, III

GENERAL SESSION - MORNING

Moderator: Lee Hager - 3M Corporation | USA
Presenters: Lee Hager - 3M Corporation | USA
James Jerome, CCC-A, M.S. - Workplace INTEGRA | USA
Theresa Schulz, Ph.D. - Honeywell Safety Products | USA
Kathryn Crane Thielen - Pepperidge Farm | USA

Hearing protector fit testing technologies are here to stay. While the technologies are interesting, and are increasingly proven technically, how is it going on the ground? What are the practical implications and considerations involved in using these systems? How is the resulting information being used by people in industry? And probably most importantly, are these technologies and the information they provide helping to prevent hearing loss in noise-exposed workers? This panel discussion will address these issues in the contexts of regulation, logistics, and upper management support. In addition, reports from the field will enable us to hear from end-users about how fit testing is working (or not) for them in their hearing conservation practice.

9:30 AM - 9:50 AM  “Implications if Your Life Depends on Your Hearing: The NRR vs the ASAF” | St. Petersburg Ballroom I, II, III
Presenter: John Casali, Ph.D., C.P.E. - Virginia Tech, Auditory Systems Laboratory | USA
MAJ Jay Clasing, OTR/L - Virginia Tech, Auditory Systems Laboratory | USA

The hearing sense is critical for maintaining situation awareness in dynamic work, military, and leisure settings. Compared to the vision sense, major advantages afforded by hearing include its omnidirectionality, “always on” status, high sensitivity, wide bandwidth, and startle response. When hearing is occluded by hearing protection devices (HPDs), including passive HPDs, hearing protection-enhancement devices (HPEDs) or military Tactical Communications and Protection Systems (TCAPS), it may indeed be protected from noise hazards but situation awareness may be degraded in the process. This perceptual effect requires extremely careful attention when protectors are selected for dynamic environments, especially where the user’s safety depends on their sensation, perception, and interpretation of auditory stimuli. This paper summarizes the results from several in-situ and high-fidelity simulation experiments at Virginia Tech concerning detection, identification, and localization tasks for various military and industrial signals, and contrasts the objective effects of a variety of HPDs, HPEDs, and TCAPS against open ear performance. These results evidence that even certain enhanced electronic protectors, as well as passive passthrough devices, significantly compromise auditory situation awareness as compared to the open ear. Considering the huge emphasis on EPA-required NRR attenuation labeling, which is obviously one-dimensional in its measurement of HPD performance and currently plays a major role in hearing protection design and testing, this paper posits the need for another metric, the Auditory Situation Awareness Factor (ASAF)*. Given the injury and death potential in situations where auditory situation awareness is key for avoiding industrial hazards or military threats, it is apparent from the data presented that at least for certain military and industrial applications, the need for predeployment testing of a protector’s specific effects on situation awareness has come of age.

9:50 AM - 10:20 AM  BREAK | Grand Bay Ballroom South

10:20 AM - 10:55 AM  KEYNOTE LECTURE: “Noise Exposure: It’s More Dangerous Than We Thought!”
Presenter: Sharon Kujawa, Ph.D. - Harvard Medical School | USA

Overexposure to loud sound can cause hearing loss, the severity of which is shaped by characteristics of the exposure and characteristics of the individual. After overexposure, thresholds are immediately elevated, but can recover for several weeks. If recovery remains incomplete, the noise-induced hearing loss (NIHL) is considered “permanent”; if thresholds return to normal, the NIHL is deemed “temporary”, with no persistent or delayed consequences for auditory function. Recent work in our laboratory (Kujawa and Liberman 2006; 2009; Lin et al 2011) has shown that significant degeneration of the cochlear nerve occurs after noise exposure, even when there is no hair cell loss, and even if thresholds have returned to normal. Such observations raise important concerns about long-term effects of apparently benign exposures and our inability to identify such noise injury with the threshold-based assessments that are our gold standard. The phenomenon of slow-onset, noise-induced, primary cochlear-nerve loss is potentially a very common problem and major contributor to the auditory perceptual handicaps of noise-exposed, aging individuals. Work supported by NIH/NIDCD R01 DC8577
The audiological data of 57 714 South African mine workers were investigated in this retrospective cohort study. The cohort included the hearing threshold data of a non-noise-exposed control group (n=10062). Participants were categorized in terms of noise exposure; level and working years, and age. Descriptive and inferential statistics were employed. The largest differences in prevalence of hearing loss, between die noise-exposed and control groups were observed at 3 and 4 kHz in the age group 36 to 45 years. Thresholds at 8 kHz were worse than expected and declines slowed down with age. High-frequency thresholds showed a non-linear growth pattern with age with a greater decline at 2 kHz with age in the noise-exposed population compared to the control group. Hearing deteriorated more across age groups with more noise-exposed years, and this deterioration was most visible after 10 to 15 working years and particularly at 3 kHz. It was shown that age affects the hearing thresholds of the noise and control groups. Within the age groups thresholds were affected differently for different noise-exposure groups (the larger cohorts but also homogeneous exposure groups) and for different exposure times.

The inherent variability of pure tone threshold measures must be considered when interpreting observed changes in pure tone thresholds, but few data are available that were collected using current equipment and procedures. We report the results of a study in which a large number of participants (N ~ 500, both genders, ages 20-69) were tested ten times during a 14-day period to determine the extent of variability in pure tone thresholds measured via standard procedures using TDH-39P supra-aural earphones. Results indicated that: over 80 % of test-retest differences were within 5 dB of the initial threshold; test-retest differences at 6 and 8 kHz were distributed slightly more broadly than at other stimulus frequencies; and test-retest differences are correlated across frequency and ears, which compromises statistical models presuming statistical independence of test-retest differences.
### 2:30 PM - 2:50 PM

**“Evaluating the Operational Impact of Hearing Impairment”**  
Presenter: Douglas Brungart, Ph.D. - Walter Reed National Military Medical Center | USA  
Benjamin Sheffield, M.S. - Walter Reed National Military Medical Center | USA

Although the ability to detect, localize and identify sounds is critically important in military operations, little is known about the relationship between an individual service member's level of hearing impairment and his or her probability of mission success on the battlefield. Similarly, little is known about the impact that the reduced auditory acuity caused by the use of hearing protection has on performance in military-relevant tasks. We are now addressing this deficiency with a series of field studies that will use wearable hearing loss simulation systems to measure operational performance as a function of the level of simulated hearing impairment. One such study will measure the impact that a parametrically-increasing simulated hearing loss has on the probability of victory in a force-on-force “paintball” combat exercise. The results will have implications both in the development of auditory fitness-for-duty standards and in the development of specifications for future hearing protection systems.

### 2:50 PM - 3:10 PM

**“Noise Induced Hearing Loss and the Working-Age Adult – A Personal Story”**  
Presenter: Valerie Stafford-Mallis, M.B.A. - Alternative Communication Services (ACS), LLC | USA

Hearing loss is an invisible disability and affects approximately three million Floridians. Valerie is an oral, late-deafened adult who earned her Master’s in Business Administration from Webster University, after losing most of her hearing. In 2009, she underwent bilateral cochlear implantation, and utilizes many types of assistive technology in her activities of daily living. As a person who lost her hearing over thirty-five years ago, Valerie has experienced first-hand the struggles faced by all persons with disabilities to maintain employment, independence and full-participation in public-life. Her presentation will detail the impacts of the progression of her hearing loss on her career, her relationships, and her leisure pursuits. She will detail what assistive technology has been helpful and what she would have liked to have known as her hearing loss progressed. The information presented in this presentation will graphically illustrate ways hearing health professionals can empower their patients beyond hearing aids and cochlear implants, as wonderful as those devices are.

### 3:10 PM - 3:30 PM

**BREAK | Grand Bay Ballroom South**

### 3:40 PM - 4:00 PM

**“Can You Hear Me Now? The Challenge of Determining Whether Workplace Noise is Increasing or Decreasing over Time”**  
Presenter: Richard Neitzel, Ph.D., C.I.H. - University of Michigan | USA  
Deron Galusha, M.S. - Yale University | USA  
Christine Dixon-Ernst, M.S., Hyg., C.I.H., M.A., CCC-A - Alcoa, Inc. | USA  
Michael McGaughey, M.P.H. - Yale University | USA  
Linda Cantley, P.T., M.S. - Yale University | USA  
Peter Rabinowitz, M.D., M.P.H. - Yale University | USA

Hearing loss prevention programs have been mandatory in many US industries for nearly 30 years. During that period, certain components of these programs – especially audiometric testing, training, and hearing protector use – have been the focus of much research and innovation. By comparison, little research has been done on evaluation of noise exposures and controls. There is in particular no consensus regarding a method for assessing temporal trends in noise exposure, and development of standardized approaches could draw more attention to the issue of noise control. A critical factor in developing metrics for noise exposure over time is the amount of noise exposure data available over the time period of interest, and how these data are interpreted. Utilizing a large dataset (>8000 measurements over a six-year period) from an aluminum manufacturing company, we evaluated several approaches to assessing temporal trends in noise exposure, including average noise levels within and across facilities; percentage of employees exposed over the allowable level; and percentage of similar exposure groups (SEGs) exposed over the allowable level. In this analysis, some facilities showed declines in noise exposure over the observation period. However, despite the company’s strong emphasis on hearing loss prevention programs, other facilities showed no change or increases in noise exposure over time using these metrics. Our results suggest that a multi-pronged approach may be needed to evaluate time trends in noise exposures, and highlight the need for additional research on evaluation of noise exposures and controls.

### 4:00 PM - 4:20 PM

**“Prevalence of Workers with Shifts in Hearing by Industry: A Comparison of Occupational Noise Exposure Regulation Criteria”**  
Presenter: Elizabeth Masterson, Ph.D., C.P.H., C.O.H.C. - National Institute for Occupational Safety and Health | USA

Objective: The purpose of this study was to compare the prevalence of workers with National Institute for Occupational Safety and Health significant threshold shifts (NSTS), Occupational Safety and Health Administration standard threshold shifts (OSTS), and OSTS with age correction (OSTS-A), by industry. Methods: Male and female worker audiograms were examined for the years 2001 through 2010. NSTS, OSTS and OSTS-A prevalences were estimated and compared by industry. Results: A total of 20% of workers had at least one NSTS, 14% had at least one OSTS and 6% had at least one OSTS-A in the time period. For most industries, the OSTS and OSTS-A criteria identified 28-36% and 66-74% fewer workers with shifts in hearing than the NSTS criteria, respectively. Conclusions: Current regulations should be updated. The OSTS and OSTS-A criteria likely fail to identify large numbers of workers who need intervention to prevent additional hearing loss.

### 4:20 PM - 4:40 PM

**“Effectiveness of Interventions to Prevent Occupational Noise-Induced Hearing Loss, Update of a Cochrane Systematic Review”**  
Presenter: Jos Verbeek - Finnish Institute of Occupational Health | Finland

We updated a Cochrane Systematic Review to find out what evidence the effectiveness of hearing loss prevention programmes is. One study showed that noise levels decreased after stricter legislation in the mining industry but there were no further controlled studies that noise reduction can be effectively implemented. We found 15 studies with 79,986 participants that evaluated the long-term effects of hearing loss prevention programmes. The use of hearing protection in well-implemented HLPPs was associated with less hearing loss but not with worker training, audiometry now personal noise monitoring. Compared to non-exposed workers, four average hearing loss prevention programmes did not reduce the risk of hearing loss to below an acceptable level. Two comparable additional studies showed a substantial risk of hearing loss in spite of a HLPP. Better prevention programmes and better quality studies especially of engineering controls are needed to better prevent noise-induced hearing loss.
In 2007, the National Institute for Occupational Safety and Health (NIOSH) partnered with the National Hearing Conservation Association (NHCA) to create the Safe-in-Sound Award™ for Excellence and Innovation in Hearing Loss Prevention (www.safeinsound.us). The objectives of this initiative are to recognize organizations that document measurable achievements and to share leading edge information to a broader community. Hearing health practices were evaluated against key performance indicators in a rigorous systematic review process designed to capture and evaluate the successes. The fifth annual round of Safe-in-Sound Excellence and Innovation in Hearing Loss Prevention Awards™ will be presented. Each of the award recipients will accept their awards and briefly present their success stories. Please attend to celebrate their accomplishments and learn from those in the forefront of our efforts to prevent work-related induced hearing loss.

**5:25 PM - 6:30 PM**
**BREAK & Posters | Committee Meetings | Networking Time**

**5:25 PM - 6:30 PM**
**Student Meet & Greet (Students ONLY)**

**6:30 PM - 9:30 PM**
**FRIDAY NIGHT EVENT - DALI MUSEUM**
Dali Museum | 1 Dali Blvd | St. Petersburg, FL 33701

**Transportation:**
The Dali Museum is a five minute walk from the Hilton St. Petersburg Bayfront hotel. If you require transportation, the hotel shuttle service will be happy to drive you. Please make arrangements at the hotel front desk.

**Schedule of Events:**
6:20 p.m. - 6:30 p.m. | Meet in hotel lobby and walk to The Dali Museum
6:30 p.m. - 9:30 p.m. | Buffet dinner, cash bar, music & networking
*Guests are welcome to walk back to the hotel at any point in the evening.*
Saturday, February 23, 2013
Platform Presentation Descriptions

7:30 AM - 5:30 PM | Registration and Information Desk Open | Lobby II Foyer
7:45 AM - 8:45 AM | Round Table Chat Sessions with Buffet Breakfast | Grand Bay Ballroom North

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<tr>
<td>2. FM &amp; Classroom Acoustics</td>
<td>Scott Lake</td>
<td>14. NHCA: Increasing Conference Attendance</td>
<td>Bill Murphy</td>
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<td>5. Field Verification, Fit Testing &amp; HPD Attenuation</td>
<td>Brad Witt/Elliott Berger</td>
<td>17. Gender Issues: Dealing with a Mostly Male Population in the Workplace</td>
<td>Tim Rink</td>
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<td>6. Students &amp; First Timers</td>
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<td>18. Safe-in-Sound Award™</td>
<td>Thais Morata</td>
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<tr>
<td>7. Hearing Impaired Worker Considerations</td>
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<td>19. Tinnitus &amp; Auditory Processing Deficits Due to Ototoxic Exposure</td>
<td>Vishakha Rawool</td>
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<td>8. Age Correction &amp; Noise Exposure</td>
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<td>20. HLPP Coursework in Au.D. Programs</td>
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<td>9. Mobile Technician Discussion</td>
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<td>21. CAOHC</td>
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<tr>
<td>10. NASM HCP Applications</td>
<td>Kris Chesky</td>
<td>22. Researcher’s Table #1</td>
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<tr>
<td>11. Music Induced Hearing Loss</td>
<td>Cory Portnuff</td>
<td>23. Researcher’s Table #2</td>
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<tr>
<td>12. Determining Work Relatedness</td>
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<td>24. Got Chat?</td>
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BREAKOUT SESSION #1 - MUSIC

9:00 AM - 9:20 AM | “Accountability in Schools of Music Requires a Noise Exposure Assessment Standard” | St. Petersburg I
Presenter: Kris Chesky, Ph.D. - University of North Texas | USA
Amyn Amlani, Ph.D. - University of North Texas | USA
As illustrated in recent reports by NIOSH and by the National Association of Schools of Music (NASM), noise exposure assessment protocols being used for characterizing music-related noise levels in educational settings has the potential for fostering confusion, dissemination of misinformation, and mis-guided recommendations. Using recent case examples of both public school and tertiary music programs being flagged for excessive sound generation and/or non-compliance to new accreditation standards, this session will illustrate emerging problems while advocating for the development of a new noise exposure assessment standard that is specifically designed to address music-related hearing concerns in the educational sector.

9:20 AM - 9:40 AM | “Clinical Verification of Custom-Fitted Musicians Earplugs: How Much Deviation from “Flat” is Acceptable?” | St. Petersburg I
Presenter: Brian Fligor, Sc.D. - Boston Children’s Hospital | USA
Custom hearing protection devices that are designed to attenuate sound levels uniformly across a wide range of the audible frequency spectrum (“flat frequency attenuators” a.k.a. Musicians Earplugs™) are a common recommendation for hearing loss prevention programs for musicians. In many circumstances, Musicians Earplugs™ are a vital component of a hearing loss prevention program (HLPP) for musicians, as other elements of an HLPP may not be adequate to mitigate risk for music-induced hearing disorders. The use of Musicians Earplugs™ is not without controversy (e.g., Chesky, et al, 2009), and claims that these earplugs attenuate sound level by a prescribed amount across the target frequency spectrum might be erroneous in individuals in whom optimal fit is not achieved. This presentation will describe MIRE (probe-microphone) insertion loss measures of two series of Musicians Earplugs™ that were deemed acceptable and unacceptable by professional musicians, and will suggest a framework for interpreting verification measures.

9:40 AM - 10:00 AM | “Effects of Recreational Noise on Otoacoustic Emissions and High Frequency Thresholds” | St. Petersburg I
Presenter: Colleen LePrel, Ph.D. - University of Florida | USA
Edward Lobbarinas, Ph.D. - University of Florida | USA
Scott Griffiths - University of Florida | USA
Christopher Spankovich, Au.D., Ph.D. M.P.H - University of Florida | USA
Distortion product otoacoustic emission (DPOAE) amplitude and extended high frequency (EHF) thresholds have been suggested as tests that may provide a warning for “pre-clinical” hearing loss. Deficits detected using these tests might provide a warning that damage is likely to accrue at lower frequencies, critical for speech perception, if noise exposure continues. Regardless, observation of EHF/DPOAE deficits suggests cochlear pathology. Here, we describe deficits in DPOAE and EHF in college students exposed to recreational noise.

10:00 AM - 10:30 AM | BREAK | Grand Bay Ballroom South
**10:30 AM - 10:50 AM**

**“Effect of Hearing Loss and Other Factors Influencing Use of Hearing Protection by Trumpet Players”**

**Presenter:** Mead Killion, Ph.D. - E tymotic Research - Northwestern University | USA

Although a great many brass players, and trumpet players in particular, successfully use high-fidelity earplugs, others report failure with the same earplugs. The following factors may operate to discourage a brass player from using hearing protection: 1. Lack of acclimatization time 2. Loss of “Fortissimo Blare” from the aural distortion generated by the 110-120 dB SPL produced at the open ear with fortissimo playing 3. Shallow earmold seal, leading to a large occlusion effect 4. Inadequate seal of the earmold in the ear canal and/or the wrong acoustic mass in the sound channel 5. Hearing loss: Many harmonic overtones of even moderately loud playing may become inaudible with earplugs to a lifetime trumpet player with high-frequency loss. The limitations imposed by each of these can usually be overcome with modifications of the HPD or with acclimatization time, allowing a lifetime of playing without the all-too-common “musicians hearing loss” and its frequent companion, tinnitus.

**10:50 AM - 11:10 AM**

**“Battle of OAEs: Measuring Effects of Acoustic Overexposure in Band Members and Directors”**

**Presenter:** Sridhar Krishnamurti, Ph.D. - Auburn University | USA

Outer hair dysfunction associated with noise exposure can be evaluated by two non-invasive tools: transient evoked otoacoustic emissions (TEOAEs) and distortion product otoacoustic emissions (DPOAEs). Click stimuli are used to generate TEOAE responses while DPOAE recording requires the application of two pure tone stimuli. If audiometric thresholds exceed 20-30dB HL, TEOAE and DPOAE responses are expected to be absent (Kemp et. al., 2002). We studied the value of using TEOAEs and DPOAEs in measuring acoustic overexposure effects in band members (students) and band directors. Using a priori criteria established for DPOAEs and TEOAEs, we found that TEOAE band reproducibility criteria identified about one-third of ears to be at-risk while DPOAE SNR criteria identified about one-sixth of ears to be at risk. Band directors consistently showed poorer OAEs than band members. Implications of these results will be discussed in terms of hearing conservation measures needed for this noise-exposed population.

**11:10 AM - 11:30 AM**

**“Sound Exposure of Professional Orchestral Musicians During Solitary Practice”**

**Presenter:** Ian O’Brien - University of Sydney | Australia

Professional orchestral musicians are often exposed to potentially hazardous sound levels while playing in ensemble, with the most significant portion of an orchestral musicians’ workplace sound exposure known to be received from the individual’s own instrument. Despite this, there is little data on levels these musicians face during the private practice which is undertaken daily by these musicians, making accurate risk assessments extremely difficult. This study aimed to determine possible sound exposure to these musicians during personal practice. Subjects initially completed a questionnaire before undertaking multi-point sound monitoring in a controlled environment. Levels observed were similar to those reported in ensemble for the most at-risk from this activity. Improved solutions and instrument-specific training is required amongst this population to ensure they develop effective noise management strategies both in the orchestra and while practicing alone.

**BREAKOUT SESSION #2 - PREVENTION/EDUCATION**

**9:00 AM - 9:20 AM**

**“Sound Check Australia: A Citizen Science Approach to Noise and Hearing Conservation Research”**

**Presenter:** Megan Gilliver, Ph.D. - National Acoustics Laboratories | Australia

In August 2012, researchers from the National Acoustic Laboratories and the HEARing Cooperative Research Centre teamed up with Australia’s national broadcaster, the ABC, to develop a citizen science project on noise and hearing conservation. The project, Sound Check Australia, coincided with National Science Week and Hearing Awareness Week and was promoted nationwide to thousands of potential participants. Participants were invited to complete an online survey and a simple online speech-in-noise hearing check. Topics covered by the survey included: general and hearing-related health; exposure to occupational and leisure noise; exposure to ototoxic substances; attitudes towards noise, hearing loss, and loud music venues; use of personal audio devices; and the social impacts of hearing loss. In this presentation, the development of the project and the advantages and disadvantages of a citizen science approach will be discussed. Preliminary findings will also be presented.

**9:20 AM - 9:40 AM**

**“Effectiveness of a Brazilian Version of the “Dangerous Decibels” Educational Program”**

**Presenter:** Keira Knobel, Ph.D. - University of Campinas | Brazil

Maria Cecilia P. M. Lima, Ph.D. - University of Campinas, Campinas | Brazil

We adapted the “Dangerous Decibels” educational program for Brazilian children. Our aim was to evaluate the effectiveness of this version of the “Dangerous Decibels” in increasing students’ knowledge and positively changing their attitudes and intended behaviors related to NIHL prevention. Baseline questionnaires were completed by 220 third to fifth grade students from two schools. 155 children from one school received a 60 minute interactive classroom presentation on hearing and hearing loss prevention and filled out questionnaires immediately after the presentation. The remaining students from the other school served as a comparison group. All students filled out follow-up questionnaires three months after baseline. The comparisons of the baseline and immediate questionnaire showed that the students exhibited significant improvements in knowledge and intended behavior related to NIHL prevention. The data of the 3 months follow-up the comparison with the control group is still being analyzed. Final results will be discussed.

**9:40 AM - 10:00 AM**

**“DiscovEARy Zone: Hearing Conservation Outreach from the American Academy of Audiology”**

**Presenter:** Sharon Sandridge, Ph.D. - Cleveland Clinic | USA

Robert Ghent, Au.D. - Honeywell Safety Products | USA

The DiscovEARy Zone (DZ) is an interactive exhibit designed to promote hearing loss prevention (HLP) to the public regardless of age. DZ comprises an educational experience that can be used in the workplace, in an audiology practice, at health fairs, and in schools to demonstrate the principles of hearing conservation as well as educate participants about the dangers of exposure to high-intensity sound. Interactive activities range from low-tech table top displays to high-tech iPad games. DZ was operated as an outreach program for the clinical audiologist at AudiologyNOW! this past March. Survey data regarding DZ were collected during that conference and will be presented and discussed.
**“Bystander Impulse Noise Exposure From Small-Caliber Weapons: How Close Is Too Close?”**

**Presenter:** CAPT William Murphy, Ph.D. - National Institute for Occupational Safety and Health | USA

**Supporting Authors:**
- Gregory Flamme, Ph.D. - Western Michigan University | USA
- Deanna Meinke, Ph.D. - University of Northern Colorado | USA
- Donald Finan, Ph.D. - University of Northern Colorado | USA
- James Lankford, Ph.D. - Northern Illinois University | USA
- Michael Stewart, Ph.D. - Central Michigan University | USA
- Edward Zechmann - National Institute for Occupational Safety and Health | USA
- Caroline Dektas - National Institute for Occupational Safety and Health | USA

Exposure to impulse noise produced by gunshots is well known to be hazardous to hearing. Most commonly the hearing conservation professional will be concerned about protecting the hearing of the person(s) firing a gun. At recreational events or exhibitions, the bystanders can also be at risk of hearing loss. Thus, guidelines must be developed to define safe distances from the shooter(s). At an outdoor range, impulses were recorded for distances of 1.5, three, and six meters from the shooter with an array of eighteen microphones from fifty-four rifles, shotguns and pistols. Contour plots of exposure levels calculated with several damage risk criteria were developed. Multiple shooters were assumed to be equally spaced and linear superposition of the acoustic signals was applied to estimate the exposures for bystanders and other shooters.

**“Shooting Habits of Youth Recreational Firearm Users”**

**Presenter:** Michael Stewart, Ph.D. - Central Michigan University | USA

**Supporting Authors:**
- Deanna Meinke, Ph.D. - University of Northern Colorado | USA
- Jessica Synders, Au.D. - Central Michigan University | USA
- Kayla Howerton, B.A. - University of Northern Colorado | USA

Youth shooters engage in outdoor target shooting events to learn and practice the skill. The majority of the subjects reported using large caliber firearms capable of rapid fire (i.e. bolt action or semi-automatic) for both hunting and target practice activities. Hearing protective devices are reportedly used by 56% of participants while target shooting and only 16% of the time while hunting. Approximately 10% of youth reported constant tinnitus and 45% notice tinnitus occurs or worsens after shooting. This research highlights the need for early education and intervention efforts to minimize the risk of NIHL in youths. Hearing conservation needs for this population will be discussed.

**“Auditory Risk Estimates for Youth Target Shooting”**

**Presenter:** Deanna Meinke, Ph.D. - University of Northern Colorado | USA

**Supporting Authors:**
- James Lankford, Ph.D. - Northern Illinois University | USA
- Gregory Flamme, Ph.D. - Western Michigan University | USA
- Michael Stewart, Ph.D. - Central Michigan University | USA
- Donald Finan, Ph.D. - University of Northern Colorado | USA
- Jacob Soendergaard, M.Sc., B.Eng. - GRAS Sound and Vibration | USA
- William Murphy, Ph.D. - National Institute for Occupational Safety and Health | USA
- Trevor Jerome - National Institute for Occupational Safety and Health | USA

Youth hunters 6 to 15 years of age are estimated to number 1.6 million. The peak sound pressure levels of recreational firearms frequently exceed the recommended exposure limits. This research study surveyed youth recreational firearm users regarding their shooting habits, reported use of hearing protection devices, self-assessed auditory status, and attitudes about firearm noise and hearing loss risk. The majority of the subjects reported using large caliber firearms capable of rapid fire (i.e. bolt action or semi-automatic) for both hunting and target practice activities. Hearing protective devices are reportedly used by 56% of participants while target shooting and only 16% of the time while hunting. Approximately 10% of youth reported constant tinnitus and 45% notice tinnitus occurs or worsens after shooting. This research highlights the need for early education and intervention efforts to minimize the risk of NIHL in youths. Hearing conservation needs for this population will be discussed.

**“Noise Induced Hearing Loss (NIHL) in the US Military”**

**Presenter:** CPT Virginia Bailey, Au.D., M.B.A. - Fort Jackson Army Hearing Program | USA

**Supporting Authors:**
- Kathleen Campbell, Ph.D. - Southern Illinois University School of Medicine | USA
- CPT Rebecca Ludwig, Au.D., CCC-A - United States Army - Fort Jackson Army Hearing Program | USA

This presentation will provide an overview of NIHL and hearing protectors currently available in the military. CPT Virginia Bailey, Au.D., M.B.A. will provide recent statistics regarding NIHL (noise-induced hearing loss) (i.e., incidence, prevalence and types in the US Department of Defense (DoD). She will also discuss NIHL’s impact on survival and efficacy for our Servicemen, which have a higher incidence of NIHL compared to civilians. CPT Bailey will also review current approaches to hearing protection devices (HPDs) reviewing the many currently DoD approved HPDs. From cigarette butts to tactical communication and protective systems (TCAPS), the evolution over the years of HPD use has been drastic.
There is a requirement for a practical and economical means of quantifying the ability to localize sound sources for a person wearing various hearing protective devices, including earmuffs, earplugs and helmets. New protective products are being developed with a design emphasis on maintaining natural awareness. There is no standardized method to evaluate these products. One approach for a laboratory test is to utilize a hemispherical array of speakers that simulates a realistic listening environment. The array is configured to reproduce the sounds of a person wearing the headgear in a noise-free environment, allowing for objective measurement of the system's performance.

Auditory Localization: Standardized Tests for Headgear Evaluation

Presenter: Kevin Michael, Ph.D. - Michael & Associates | USA
Presenter: Jeffrey Komrower - Noise Control Engineering, Inc. | USA
Presenter: Tomasz Letowski, Ph.D., D.Sc. - U.S. Army Research Laboratory | USA

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“Simultaneous Measurement of Ear and Shoulder Noise Exposures” | Williams & Demens
Presenter: William Clark, Ph.D. - Washington University School of Medicine | USA
Specifying a 3 dB exchange rate (ER) in noise standards has several advantages: 1) it is simple and easily calculated; 2) mathematically correct for describing total acoustic energy in an exposure; 3) for continuous noise the ER doesn’t matter; 4) for intermittent or fluctuating noise it is usually more conservative than the 5 dB exchange rate. But there are disadvantages if it’s wrong, including overstating hazard and expending resources to protect hearing for those who don’t need it. Whether it is the “correct” rate, or even valid depends upon how well it predicts risk of hearing loss caused by noise. Reviewed are the biological mechanisms that contribute to hearing loss, studies of temporary and permanent effects in animal and human subjects, and descriptions of nonlinear and active hearing mechanisms that contribute to our understanding of the ER from a hearing, rather than a noise perspective.

“The Exchange Rate and Noise-Induced Hearing Loss” | Williams & Demens
Presenter: Alice Suter, Ph.D. - Alice Suter and Associates | USA
The exchange rate (ER) is the relationship in dB between the allowable noise exposure level and duration prescribed by standards or regulations. Today nearly every industrialized nation has adopted the 3-dB ER with the exception of OSHA in the U.S. and certain federal agencies that follow its lead, which still use the 5-dB ER. This presentation will discuss the history of the development of the 3-dB and 5-dB ERs including consensus and regulatory activities, with attention to the many questionable assumptions inherent in the selection of the 5-dB ER. The benefits of intermittency found in the laboratory do not translate to the workplace, and even in the most favorable conditions, do not justify the use of the 5-dB ER. Recent research support the use of the 3-dB ER with impulse noise in combination with continuous noise, especially if a measure of impulsiveness such as kurtosis is taken into account.

“Simultaneous Measurement of At Ear and Shoulder Noise Exposures” | Williams & Demens
Presenter: Edward Hayes - Clarkson University | USA
Richard Neitzel, Ph.D., C.I.H. - University of Michigan | USA
Kevin Michael, Ph.D. - Michael & Associates, Inc. | USA
Michael McTague, M.P.H. - Yale University | USA
Christine Dixon-Ernst, M.S., Hgy., C.I.H., M.A., CCC-A - Alcoa | USA
Peter Rabinowitz, M.D., M.P.H. - Yale University | USA
The field effectiveness of hearing protective devices (HPDs) varies greatly between individuals and may not correspond to standardized measures such as the EPA Noise Reduction Rating (NRR). HPD attenuation provided to an individual varies with time due to many factors, including work environment, type of noise exposure and physical activity. There is growing interest in the concept of fit testing of hearing protection, but this only provides a snapshot assessment of hearing protector fit. We describe a series of full shift noise dosimetry measurements performed both in-ear and on-the-shoulder, allowing instantaneous attenuation to be derived for the entire work shift. Preliminary results indicate that noise reduction levels range from 4 to 23 dB. Although lower than the manufacturers’ NRR, attenuation was sufficient to lower personal exposure to less than 85 dBA. Exposure level under the EPA Noise Reduction Rating (NRR). HPD attenuation provided to an individual varies with time due to many factors, including work environment, type of noise exposure and physical activity. There is growing interest in the concept of fit testing of hearing protection, but this only provides a snapshot of the ER. The acid test for an exchange rate (ER) is its fit with studies of noise-induced permanent threshold shift in people with intermittent or fluctuating daily exposures. Most advocacy for a 3-dB ER has relied, directly or indirectly, on Passchier-Vermeer’s (1973) review of 11 such studies, which concluded that the 3-dB ER fit the data reasonably well (but did not compare any other ER). We reviewed all of these studies, and included papers from our own files and from a PubMed search (excluding papers limited to impact/impulse exposures). Very few papers included enough information to allow comparison of different ERs (e.g., 3-dB vs. 5-dB); often, exposure documentation was so scanty that no average exposure value could be calculated. Available data suggest that the 3-dB ER overestimates risk for intermittent or fluctuating exposures, but do not prove that a different ER (e.g., 5-dB) would provide a significantly better fit.

“1983 – OSHA ENACTS HEARING CONSERVATION AMMENDMENT… 2012 – SO WHAT HAS CHANGED?” | Williams & Demens
Presenter: James Banach, M.B.A. - 3M Corporation | USA
In 1985 Royster and Royster published a survey on Hearing Protection Utilization in US industry. Information about the utilization of hearing protection devices was obtained through interviews at 218 facilities. The primary objectives of the study were to identify problems related to HPD use and to develop a reference manual to guide industrial personnel in achieving maximum benefit from HPDs. Since November of 2011 interviews with 20 companies identified as having either better than average hearing conservation programs or large programs often with international scope have been performed. The results of these interviews are presented with one eye on the Royster's study and the other looking for the current challenges and successes in hearing conservation programs. It is apparent that in some ways nothing has changed and in others unique approaches including problem solving, employee involvement and program assessment offer interesting opportunities that go beyond regulation compliance to effectiveness.
“Replacing Cells in the Inner Ear: The Path to a Regenerative Cure for Hearing Loss” | Andrea Boidman, Executive Director - Hearing Health Foundation | USA
Inner ear hair cells are located in most animals, and are required for normal hearing. These cells convert sound information into electrical signals that are sent to the brain. Once hair cells die in mammals — including humans — hearing loss is permanent. We know that chickens and many other species spontaneously regenerate their hair cells, but humans do not yet have this ability. In 2011, Hearing Health Foundation launched the Hearing Restoration Project (HRP). A new, multi-institutional consortium, the HRP is comprised of some of the country’s leading researchers in the field of regeneration. HRP’s goal is to offer a biologic cure for hearing loss in a period of ten years, so that humans — like chickens — will be able to regenerate their damaged hair cells and once again hear. This talk would present the work of the consortium members in the framework of the HRP model.

“Recommended Auditory Processing Test Battery for Workers with Occupational Exposures to Ototoxins” | Vishakha Rawool, Ph.D. CCC-A - West Virginia University | USA
According to the WorkSafe guidelines from Australia, workers who are exposed to ototoxins and complain of hearing difficulties should be referred for evaluation of the central parts of the auditory system even in the presence of normal auditory thresholds. This presentation will include recommendations for a test battery for such workers based in the following considerations: Ease of administration and interpretation in clinical settings, evaluation of brainstem and cortical auditory pathways, evaluation of binaural (dichotic) and temporal auditory processing skills, minimal effect of hearing loss, minimal effect of linguistic competency, use of subjective and objective measures, control of patient fatigue and learning effects, and minimal effect of cognitive variables in necessary since solvent-exposed workers may have some difficulty in modulating their attentional resources according to task demands, as apparent in similar P300 amplitudes for rare and oddball stimuli and vigilance-decrement during methylene chloride exposure.

The music and entertainment industries, particularly live music venues and events, present challenges to the implementation and management of hearing conservation programs and regulatory enforcement that are not typical of most noisy industries. Here we take a look at some of these management issues from both inside and outside the music and entertainment industries. We will compare and contrast the regulatory environment for occupational hearing loss in music and entertainment versus other industries, and in the US versus the UK where an active regulatory effort has been in place for several years. Data from studies in a small slice of the music and entertainment sector will illustrate some of the hurdles faced, and will be followed by a discussion of how those hurdles may be cleared.

Hosted Luncheon & Awards | Grand Bay Ballroom North
11:30 AM - 12:45 PM
Award Photos | Grand Bay Ballroom North
12:45 PM - 12:55 PM
Gasaway Lecture: “Hearing Health and The Grand Scheme of Things” | Thais Morata, Ph.D. - National Institute for Occupational Safety and Health | USA
Every year, the NHCA designates one session at its annual conference as the Gasaway Lecture to recognize Donald C. Gasaway’s long and exemplary years of service, his contributions to the association, and his impact on the field of hearing loss prevention. Don Gasaway devoted himself to promoting hearing conservation and effectively used any means he could to educate others about hearing and hearing loss, to improve training, and to motivate his audiences to take action. I am deeply honored to present this year’s Gasaway Lecture. While the challenge to prevent hearing loss remains, the ways we view and address this challenge are changing. National boundaries are no longer obstacles to the transfer of knowledge, and hearing conservation is not limited to industry. Our efforts are broadening towards building a culture that promotes healthy hearing. Today we have fewer obstacles and more tools than were available to Don. This year’s Gasaway lecture will focus on ways we can optimize the exchange of skills and experience, facilitate new partnerships and expedite the research process worldwide in the pursuit of hearing loss prevention in all walks of life.

“85/3 and Other Items for OSHA’s To-Do List” | Alice Suter, Ph.D. - Alice Suter and Associates | USA
This paper will present a to-do list for OSHA of much needed improvements in its noise regulation and enforcement. For decades, groups have urged OSHA to adopt the 85-dBA PEL and the 3-dBA exchange rate, so this recommendation would be considered #1 on our list. The goals and procedures of the 85/3 Coalition were presented in a platform presentation at the 2012 Hearing Conservation Conference. This paper will report on the progress of the Coalition to date, including an overview of the Coalition Members and Pioneers. Other items on the list include recommendations for practical actions or changes. Examples would be minor changes to the existing regulation for the following: updating the ANSI standards and age correction tables, reforming the noise measurement procedures to remove the 89.9 dBA dosimeter lower threshold for assessing compliance with the PEL, and updating the sections on audiometric instruments and rooms. OSHA should also create a “best practice” guide for small business, build on its data base of noise control solutions, and provide enhanced training for its inspectors. Many of these changes are sorely needed as the existing provisions are embarrassingly out of date, and they should be effected with relatively little effort or controversy.

“Recommended Auditory Processing Test Battery for Workers with Occupational Exposures to Ototoxins” | Vishakha Rawool, Ph.D. CCC-A - West Virginia University | USA
According to the WorkSafe guidelines from Australia, workers who are exposed to ototoxins and complain of hearing difficulties should be referred for evaluation of the central parts of the auditory system even in the presence of normal auditory thresholds. This presentation will include recommendations for a test battery for such workers based in the following considerations: Ease of administration and interpretation in clinical settings, evaluation of brainstem and cortical auditory pathways, evaluation of binaural (dichotic) and temporal auditory processing skills, minimal effect of hearing loss, minimal effect of linguistic competency, use of subjective and objective measures, control of patient fatigue and learning effects, and minimal effect of cognitive variables in necessary since solvent-exposed workers may have some difficulty in modulating their attentional resources according to task demands, as apparent in similar P300 amplitudes for rare and oddball stimuli and vigilance-decrement during methylene chloride exposure.
3:10 PM - 3:30 PM  
"Auditory Dysfunction Associated with Solvent Exposure"  
**Presenter: Adrian Fuente, Ph.D. - University of Chile | Chile**

Ana Claudia Fiorini, Ph.D., Pontificia Universidade Catolica de Sao Paulo | Brazil

The aim of this research was to investigate whether solvent-exposed workers report poorer hearing performance in daily-life activities, as related to the function of the peripheral and central auditory systems, compared to non-exposed subjects. Forty-eight workers exposed to a mixture of solvents and 48 age-gender and educational level matched, non-exposed, control subjects were selected. The evaluation procedures included: pure-tone audiometry, the Random Gap Detection test, and the Amsterdam Inventory for Auditory Disability and Handicap, to investigate subjects' self-reported hearing performance in daily-life activities. A Student t test and analyses of covariance (ANCOVA) were computed to determine possible significant differences between solvent-exposed and non-exposed subjects. Pearson correlations among the three measures were also calculated. Solvent-exposed subjects exhibited significantly poorer hearing thresholds than non-exposed subjects. Also, solvent-exposed subjects exhibited poorer results for the Random Gap Detection test and self-reported poorer listening performance than non-exposed subjects. Results of the Amsterdam Inventory for Auditory Disability and Handicap were significantly correlated with the binaural average of subject pure-tone thresholds and Random Gap Detection test performance. We conclude that solvent exposure is associated with poorer hearing performance in daily life activities that relate to the function of the peripheral and central auditory system.

3:30 PM - 3:50 PM  
"Tinnitus"  
**Presenter: Edward Lobinaras, Ph.D. - University of Florida | USA**

Christopher Spankovich, Au.D., M.P.H. - University of Florida | USA

Colleen Le Prell, Ph.D. - University of Florida | USA

Exposure to high levels of noise has been shown to lead to both temporary and in some cases permanent hearing loss. However, the relationship between noise exposure and tinnitus is not as well understood. Noise exposure sometimes results in tinnitus even when the signs of hearing loss are not obvious. Conversely, studies have shown that approximately 85% of individuals with tinnitus have some degree of hearing loss. To better understand the relationship between noise exposure and tinnitus, current basic research has turned to the use of animal models. Interestingly, the animal models show that susceptibility to both hearing loss and tinnitus varies among animals; results consistent with what is reported in humans. Here we will present past and more recent data from animal models looking at noise induced tinnitus, some potential biomarkers of tinnitus, potential tinnitus pharmacotherapy, and relate these findings to current thinking about noise and tinnitus.

3:50 PM - 4:10 PM  
"Healthy Diet = Healthy Ears?"  
**Presenter: Christopher Spankovich, Au.D., M.P.H. - University of Florida | USA**

Colleen Le Prell, Ph.D. - University of Florida | USA

A few human epidemiological studies to date have shown higher intake of specific nutrients to be associated with hearing thresholds in some, but not all, studies. Variability across studies is likely related to differences in specific metrics used to quantify nutrient intake and hearing status. Most studies have used single nutrient analysis. Although this analysis is valuable, interactions between nutrients are increasingly recognized and could confound statistical modeling of single nutrient effects. Therefore, we examined the potential relationship between diet and hearing using overall dietary quality. Design. This cross-sectional analysis was based on Healthy Eating Index data and audiological thresholds. Study sample: Participants were drawn from the National Health and Nutrition Examination Survey, 2001-2002. Results: There was a positive relationship between dietary quality and threshold sensitivity at higher frequencies; benefits were largely limited to older and male participants. There was no relationship between dietary quality and threshold sensitivity at lower frequencies.

4:10 PM - 4:30 PM  
"Development of a Task-Based Noise Constraints Flight Rule for the International Space Station"  
**Presenter: Richard Danielson, Ph.D. - Baylor College of Medicine | USA**

Jose G. Limardo - NASA-Johnson Space Center | USA

During long-duration space missions on the International Space Station (ISS), crewmembers are exposed to a variety of incessant noise conditions that are produced by onboard payloads, ventilation fans, thermal control systems, and exercise equipment within the limited confines of the spacecraft. To minimize risk of hearing loss, flight rules have been developed with a task-based approach to noise constraints and recommendations for hearing protective devices on the ISS. A working group from Johnson Space Center has implemented a Noise Exposure Estimation Tool (NEET) that allows personnel in Houston's Mission Control to predict noise exposures for upcoming activities and make recommendations to flight surgeons and crewmembers. The NEET uses noise level data from a Noise Hazard Inventory (NHI) of 60+ specific locations and environmental conditions onboard ISS. This presentation will describe how personnel from NASA and its international partners employ the NHI and NEET in this unique hearing loss prevention setting.

4:30 PM - 4:50 PM  
"A Comparative Study of Changes in Firefighters Occupational Exposure to Noise"  
**Presenter: Catherine Fitzgerald - University of Alabama at Birmingham | USA**

Elizabeth Maples, Ph.D. - University of Alabama at Birmingham | USA

The purpose of this study was to examine the changes that have occurred in firefighters' personal exposure to noise in the past fifteen years. A busy metropolitan fire service where personal noise exposure monitoring was conducted in 1997 agreed to a re-evaluation of firefighters' exposures to noise. Full-shift personal noise samples were obtained from 69 active duty firefighters in spring 2012. These results were compared with 67 noise samples from 1997. A significant reduction in the mean 8-hour Time-weighted average (TWA) for noise within the group of firefighters sampled in 2012 was observed compared with the 1997 group. This reduction may be due to changes within the service and changes in fire-engine design. However, monitoring of specific noise sources indicate that firefighters continue to be exposed to high levels of impact noise which may put them at increased risk of noise induced hearing loss (NIHL).

4:50 PM - 5:00 PM  
Closing Remarks