NCRAR Newsletter

VOLUME X, ISSUE I JANUARY 2010

SPECIAL POINTS OF INTEREST:

- **NCRAR Open House January 2010**
- **Dr. Fausti is awarded the Jerger Career Award for Research in audiology**

INSIDE THIS ISSUE:

Message from the Director:
Stephen Fausti, Ph.D.

The recently published textbook, Combat Care of the Amputee (Borden Institute), features a comprehensive chapter by multiple NCRAR authors that focuses on the impairments of the auditory system related to combat injury. The NCRAR continues to bring attention to the dramatically increasing number of auditory and vestibular disabilities in Veterans and is committed to develop strategies to identify and treat them. Soldiers with amputations or other blast injuries present significant challenges related to the complexity of injuries sustained that affect multiple systems, often impairing communication and cognition. In addition, sensorineural hearing loss, unlike many other injuries, will continue to progress creating greater impairment for the injured soldier. The NCRAR is uniquely positioned to address these and other complex issues because we are a diverse group of multi-disciplinary scientists and clinicians who collaborate within the same facility to create innovative solutions for the diagnosis, rehabilitation, and prevention of auditory dysfunction.

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NCRAR Open House

On January 13th the NCRAR held its first open house for the staff of the Portland VA Medical Center. Over sixty people attended the event. Staff set up five hands-on stations around the NCRAR for guests to visit at which they learned about the auditory system and some of the research being conducted at the NCRAR.

The first station was a demonstration about otoacoustic emissions. Guests learned what otoacoustic emissions (OAEs) are and how they are used in audiology. What are OAEs? There are three sections of our ear: the outer, middle and inner ear (cochlea). Within the cochlea are tiny receptors, called hair cells, which can actually move. They are stimulated by sound coming into the ear and they add gain (volume) to sounds, especially soft sounds. This movement produces an "echo" that mimics the sound coming into the ear. This echo is called the otoacoustic emission (OAE). We measure OAEs by placing a small probe into the ear that consists of a miniature speaker and microphone. Two tones are played from the speaker. A healthy ear generates an "echo-like" response that is the result of the moving hair cells. The echo is reflected back into your ear canal. The microphone in the probe picks up the sound and displays it on the screen. We measure OAEs for research to help us explore how these tiny "hair cells" work.. Investigators at the NCRAR are researching ways to best detect changes in hearing from chemotherapeutic medicines that have the potential to destroy the hair cells in the cochlea. We use the OAEs

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Location information

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Congratulations to Dr. Stephen Fausti

Staff at the NCRAR were thrilled to learn that our Director, Stephen Fausti, is the recipient of this year's Jerger Career Award for Research in Audiology, presented by the American Academy of Audiology. This award is presented to a senior level audiologist with a distinguished career in audiology who has at least 25 years of productive research in audiology, and who has made significant contributions to the practice and/or teaching of audiology.

It is difficult to summarize Dr. Fausti's lifelong accomplishments and dedication to the field of Audiology in just a couple of paragraphs, as he has achieved so much.

Dr. Fausti's research has long aimed at improving the quality of life for the nation's Veterans who are afflicted with hearing loss, tinnitus, and/or vestibular dysfunction. Much of his career has focused on developing new strategies, protocols, and equipment for the early identification of ototoxicity. His research in the development of behavioral and objective monitoring of high-frequency hearing loss has laid the groundwork for establishing standards of clinical practice in high frequency audiometry and the development of handheld instrumentation for assessing high frequency hearing at the bedside.

Other important research conducted by Dr. Fausti includes evaluation and treatment of tinnitus, and investigation of the effects of a variety of disease processes on the auditory system including otosclerosis, diabetes and multiple sclerosis.

In 2004 Dr. Fausti was the recipient of the Paul B. Magnusen Award for Outstanding Achievement in Rehabilitative Research and Development from the VA, in recognition of his "entrepreneurship, humanitarianism and dedication to Veterans."

Dr. Fausti says his proudest achievement was founding the National Center for Rehabilitative Auditory Research (NCRAR) in 1997. Since that time the NCRAR has grown in size and scope. We currently have about 40 employees, 15 ongoing peer-reviewed and funded research projects and have an active education and outreach program.

Dr. Fausti will be attending the upcoming AudiologyNow! 2010 meeting of the AAA that will be held in San Diego CA on April 14-17 where he will receive his award at the Honors and Awards Banquet that will take place on April 15th at the Hilton Bayfront Hotel.

Meet Cody Goheen, Research Assistant

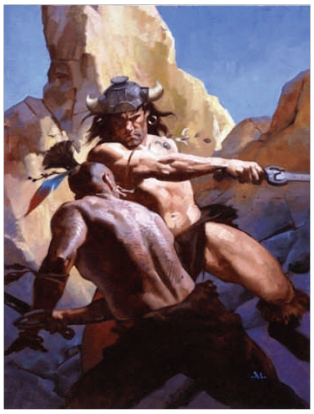
I was born in Coos Bay, a picturesque southern Oregon coastal town. By the time school started we had moved to the Columbia River gorge. For my brothers and me, living a stone's throw from the river appealed to our sense of adventure. It was like having another world outside our back door. By the time I was a teen we had moved to Tigard, where I graduated from Tigard High School in 1988. In 1990 I joined the U.S. Navy on the buddy system with a friend. However, I shipped out alone when he failed to make the required body fat! Out of Boot Camp I was flown to the aircraft carrier U.S.S. Independence CV-62 (my home for the next 3+ years) en route to the Persian Gulf. Iraq had invaded Kuwait and we would soon be at war. After Desert Storm/Shield I was stationed out of Yokosuka, Japan, later returning stateside to attend, or as we say in the Navy, "class up" - BUD/S (Basic Underwater Demolition/SEAL) training held at the Naval Special Warfare Center in Coronado, CA. I didn't complete the training (most don't) but the experience impacted me tremendously by opening my eyes to my potential.

With a stint in the Navy behind me, I returned to Portland and got my bachelor's degree in Psychology from Marylhurst University. I got a job working at an internet startup "Supertracks"—a legal Napster, which I enjoyed immensely until they shut their doors two years later. For the next several years I worked as a licensed financial advisor for Waddell & Reed and then WaMu. WaMu provided a different sort of excitement as we were robbed twice during my stay there. I left to join my mother and brother in the "booming" mortgage industry. That bubble bursting led me to seek meaningful, stable work here at the NCRAR.

As a Research Assistant at the NCRAR most of my attention is focused on the study "Prevention of Cisplatin Ototoxicity (drug-related hearing loss) with the Antioxidant Alpha-Lipoic Acid" with Principal Investigator Debbie Wilmington, and Audiologist Jane Gordon. It is a study involving an oto-protectant that may prevent hearing loss caused by chemotherapy. It feels fantastic to be conducting research with the potential to preserve hearing. As a Veteran with a family history of cancer (my father, a Veteran who died of cancer; my mother and both of her parents are cancer survivors) it's easy for me to feel connected to the Veterans we serve, which makes my job a pleasure.

Some more about me: My wife Jessica and I live in NE Portland. We met on a blind date, set up by a mutual friend who told me that Jessica was coming off a string of bad dates. Armed with this information I left her a phone message saying, "I know the line to see you is around the block, but I'd like to pull a number". When she played the message she laughed out loud.

Jessica and Cody



Cody as Conan illustrated by Gregory Manchess

We've been married six years. Most evenings you can find us at the dog park with our Havanese, Cooper. Weather permitting I fish the Deschutes River with my brother Brodie. He's an accomplished fly fisherman with a contagious enthusiasm for the sport. I lift weights and play pickup basketball several times a week, tennis in the summer. Other passions are reading and playing the guitar. Occasionally, I do some modeling for local illustrator Gregory Manchess--the guy who painted the Oregon stamp. Greg's a titan in the industry, having painted countless book covers and spreads, some with my mug on them. A few memorable collaborations (hard to forget being costumed and wielding a sword) are: The Conquering Sword of Conan by Robert E. Howard, Finn Mac Cool by Morgan Llywelyn and The Daybreakers by Louis L'Amour.

Upcoming NCRAR Events 2010

February 12 2010: Jim Miller, Golden Harvest Music for Cognitive Therapy and Roger Anunsen J.D. of mindRAMP & Associates. *Title: The therapeutic promise of older brains on music.*

March 26 2010: Frederick Gallun, Ph.D. Investigator, Anna Diedesch Research Audiologist, National Center for Rehabilitative Auditory Research, Portland OR. *Title: Auditory Processing and Blast Injury.*

April 30 2010: Weon Jun O.D. Staff Optometrist, Portland VA Medical Center. *Title: Optometry for Audiologists.*

May 14 2010: Brenda Ryals, Ph.D., Professor, Department of Communication Sciences and Disorders, James Madison University, Harrisonburg VA . *Title: TBD.*

June 18 2010: Sumit Dhar, Ph.D., Department of Communication Sciences and Disorders, Northwestern University. *Title: TBD*

July 16 2010: Lina Reiss, Ph.D. Department of Otolaryngology at the Oregon Health & Science University, Portland OR. *Title: Plasticity of pitch perception with cochlear implants*

December 3 2010: Judy Dubno, Ph.D. Department Otolaryngology – Head and Neck Surgery, Medical University of South Carolina, SC. *Title: TBD*

Most NCRAR seminars are broadcast live via v-tel to other VA facilities. Contact bonnie.becker@va.gov for information.

Seminars are held from 12 to 1 pm in PVAMC Building 101 Room 109, unless noted.

NCRAR Open House (continued from Page 1)

to detect changes in hearing before the hearing loss is so great that it interferes with communication.

At the second station, visitors had the opportunity to participate in a demonstration of Computerized Dynamic Posturography (CDP) - a tool used to assess balance. What do ears have to do with balance? Well, we maintain our balance using three systems: Vestibular (located in the inner ear), visual (eyes) and somatosensory (muscles and joints). The vestibular system is made up of different organs and structures which send signals to our brain about our head and body positions and movements. Diseases that impact hearing can therefore also impact balance. Damage to the vestibular system can result in feeling dizzy, lightheaded, off-balance or unsteady. Some people experience vertigo, which is a sensation of motion when a person is not moving. People with balance disorders are at risk for falling. CDP is used to assess which of the three balance systems may be impaired, and what strategies can be used to avoid falling. The test works by forcing patients to rely on only 1 or 2 balance systems rather than all three. For example, patients must try to maintain balance while keeping their eyes closed. Thus, they must rely on only their vestibular system and somatosensory system to maintain balance. At the NCRAR, CDP is being used to determine how balance is affected in Veterans who have received a traumatic brain injury.

At the third station visitors got to view their own ear canal and ear drum using a video otoscope— a tool used by clinicians to view the outer and middle ear on a screen. A healthy ear canal should be clear of any foreign objects. A healthy ear drum (tympanic membrane) should be intact

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NCRAR Publications and Presentations Oct 2009 - Jan 2010

Publications:

Dent M, McClaine E, Best V, Ozmeral E, Narayan R, **Gallun FJ,** Sen K, and Shinn-Cunningham BG. Spatial Unmasking of Birdsong in Zebra Finches (Taeniopygia guttata) and Budgerigars (Melopsittacus undulatus). Journal of Comparative Psychology. 2009;123(4): 357-367.

Fausti SA, Wilmington DJ, Gallun FJ, Myers PJ, **Henry JA.** Auditory Dysfunction Associated with Traumatic Brain Injury. Journal of Rehabilitation Research and Development. 2009;46(6):797-810.

Gallun FJ, Diedesch A, Engelking E. The impacts of age and absolute threshold on binaural lateralization. Acoustical Society of America, Proceedings of Meetings on Acoustics, Vol. 6, 050005 (2009). http://scitation.aip.org/POMA

Henry JA, James KE, Owens KK, Zaugg TL, Porsov E, Silaski G. Auditory test result characteristics in subjects with and without tinnitus. Journal of Rehabilitation Research and Development. 2009;46(5):619-632.

Henry JA, Zaugg TL, Myers PM, Kendall CJ. Progressive Tinnitus Management: Counseling Guide. Long Beach, CA: VA Employee Education System, 2010.

Konrad-Martin D, James KE, Gordon JS, Reavis KM, Phillips DS, Bratt GW, **Fausti SA**. Evaluation of audiometric threshold shift criteria for ototoxicity monitoring. Journal of the American Academy of Audiology. In Press, 2009.

Konrad-Martin D, Austin DF, Griest S, McMillan GP, McDermott D, Fausti SA. Diabetes-related changes in auditory brainstem responses. Laryngoscope, 2009 Nov 10. [Epub ahead of print].

Wilmington D, Lewis MS, Myers P, **Gallun FJ, Fausti SA.** (2009). Hearing Impairment Among Soldiers: Special Consideration for Amputees. In P. Pasquina (ed.) Care of the Combat Amputee. Bethesda: Borden Institute, Chapter 14:1-17.

Submitted publications:

Dille MF, Konrad-Martin D, Gallun F, Helt WJ, Gordon JS, Reavis KM, Bratt GW, **Fausti SA**. Tinnitus onset rates from chemotherapeutic agents and ototoxic antibiotics: Results of a large prospective study. Submitted to Journal of the American Academy of Audiology 2009.

Lawson N, Thompson K, **Saunders GH** et al. Sound Intensity and Noise Evaluation in a Critical Care Unit. Submitted to American Journal of Critical Care 2009.

Lewis MS, Gallun FJ, Gordon J, Lilly D, Crandell C. A pilot investigation regarding speech-recognition performance in noise for adults with hearing loss in the FM+HA listening condition. Submitted to Volta Review 2009

Lewis MS, Lilly D, Hutter M, Bourdette D, Fitzpatrick M, **Fausti SA.** Audiometric and subjective hearing status of individuals with multiple sclerosis and without multiple sclerosis. Submitted to International Journal of MS Care 2009.

Meikle MB, **Henry JA, Griest SE**, Stewart BJ, Abrams HB, McArdle R, Myers PJ, Newman CW, Sandridge S, Turk DC, Folmer RL, et al. The Tinnitus Functional Index: A new clinical measure for chronic, intrusive tinnitus. Submitted to Ear and Hearing 2009.

Presentations:

Brennan M, **Gallun FJ,** Souza PE. Do Aided Amplitude Modulation Detection Thresholds Predict Aided Speech Recognition? Poster presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR, October 2009.

Carlson J, **Diedesch A, Beasley R, Tsukuda P, Gallun FJ.** Binaural processing in younger and older listeners. Poster presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR, October 2009.

Dille M, Diedesch A, Billings C, Fitzer J, Gallun FJ. Electrophysiological measurements during rapid sound processing. Poster

NCRAR Publications and Presentations (Continued from Page 5)

presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR, October 2009.

Dille ML, **Konrad-Martin D, Jacobs P, McMillan G, Fausti, SA**. Using DPOAE Magnitude and Phase in the Early Detection of Ototoxicity. Poster presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR, October 2009.

Fausti SA, Folmer R, Saunders GH. A VA perspective on hearing loss prevention. Workshop presented at DARPA/MTO: Bionic Ear-Enhancing Plug (BEEP), Arlington VA, October 2009.

Fausti SA, Gallun FJ, Saunders GH. NCRAR Research: Traumatic Brain Injury and Dual Sensory Impairment. National VHA/DoD Conference: Sensory Impairment Issues in Traumatic Brain Injury. Chicago IL, December 8-10, 2010

Gallun, FJ. Relating blast exposure to central auditory dysfunction Presented at the NCRAR Pre-conference workshop: Current directions and interdisciplinary approaches to mTBI. Portland, OR, October 2009.

Gallun FJ, Diedesch A, Beasley R, Tsukuda P. Binaural and Monaural Temporal Integration with Older Ears. Poster presented at Aging and Speech Communication, Bloomington, IN, October 2009

Gallun FJ, Binaural temporal integration in younger and older listeners. Presented at Boston University Binaural Hearing Conference, Boston, MA, October 2009.

Gladd D, Saunders GH, Pulliam P. Ambient Noise Levels in the Chemotherapy Clinic. Poster presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR, October 2009.

Henry JA, Zaugg TL, Kendall CJ. Telehealth Management of Tinnitus for TBI Patients. Presented at the NCRAR Pre-conference workshop: Current directions and interdisciplinary approaches to mTBI. Portland, OR, October 2009.

Kendall CJ, Kerns R, D'Arco S, Michaelides E, **Henry JA, Zaugg T**. Cognitive Behavioral Therapy with Standard Care Versus Standard Care Alone for the Management of Tinnitus Among Veterans: A Pilot Study. Poster presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR, October 2009.

Konrad-Martin D. Fast, Cheap and Accurate Methods for Ototoxicity Monitoring. Podium presentation at the NCRAR Seminar Series, November, 2009

Myers PJ, Zaugg TL, Henry JA. Traumatic Brain Injury and Tinnitus. ASHA Audiology Conference, Traumatic Brain Injury (TBI): Effects on Hearing, Memory, and Cognition. An online conference for audiologists and speech-language pathologists. October, 2009.

O'Connell Bennett KL, Billings CJ, Molis MR, Leek MR. The Effects of Competing Noise Types on Auditory Evoked Potentials. Poster presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR, October 2009.

Saunders GH. Auditory Rehabilitation Beyond Hearing Aids. Invited presentation at the UCSF Audiology-Amplification Update IX, San Francisco, CA, October 2009.

Saunders GH. Evaluation of Approaches to Auditory Rehabilitation of mTBI. Presented at the NCRAR Pre-conference workshop: Current directions and interdisciplinary approaches to mTBI. Portland, OR, October 2009.

Schuette A, Griest S, Zaugg T, Henry JA. Association of Individual Patient Factors on Tinnitus Treatment Success. Poster presented at the NCRAR biennial Conference: The Ear Brain-System: Approaches to the Study and Treatment of hearing loss. Portland OR,

Message from the Director (continued from Page 1)

The NCRAR was created in 1997 with my vision to have the only VA Center of Excellence and national resource dedicated to the understanding and rehabilitation of auditory dysfunction, including research and development, the training of clinicians and researchers, and the dissemination of information to professionals and to the lay public. In 1998, the NCRAR had a staff of 12 people working on four funded research initiatives. Now the NCRAR has grown to over 46 scientists, clinicians, statisticians, engineers, technicians, students, and support staff and we are involved in more than 30 current research initiatives equaling nearly $6 million in peer-reviewed research funding annually. The total funding garnered by the NCRAR since its inception is approximately $62,000,000.

My philosophy for the Center is to have a collaborative environment where individuals with specific and diverse areas of expertise can interact with others to build on each other's strengths. Instead of a silo environment of individual researchers, our Center was designed for us to work collaboratively in the same facility, which creates a synergistic research setting. Our infrastructure allows the center to support investigators in all aspects of research, including statistics, engineering, and grant administration. This idea has led the NCRAR to become an international hub for translational research, education and outreach for professionals, Veterans and the general population with the momentum for continued growth. The NCRAR now has a responsibility to foster this innovative research setting to identify and treat hearing loss and vestibular impairment, ultimately leading to improved rehabilitative outcomes and quality of life. I am enormously proud to be a member of this community and have high expectations for the future of the NCRAR.

Joseph Istvan 1950-2009

NCRAR was truly saddened to learn of the passing of Joe Istvan, NCRAR biostatsician, who has worked with many at the Center over the last few years. He will be missed by all of us.

NCRAR Grants 10/09 to 1/10

FUNDED

Henry, JA & Myers PJ (PIs). Multi-Site Evaluation of Progressive Tinnitus Management. VA RR&D.

SUBMITTED

Folmer, RL (PI). Clinical Trial of Transcranial Magnetic Stimulation for Relief of Tinnitus. VA RR&D.

Folmer, RL (PI) Associations Between Neuronal Fiber Tract Injuries and Auditory Processing Disorders in People with Multiple Sclerosis. Synergistic Idea Award DoD Multiple Sclerosis Research Program.

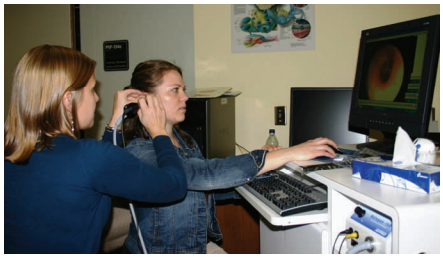
Henry JA, Zaugg TL, Myers PJ (PIs). Telehealth Tinnitus Intervention for Patients with TBI. VA RR&D.

Dille M (PI) Konrad-Martin D (Co-PI). Individualized Objective Measures for Early Detection of Ototoxicity. VA RR&D.

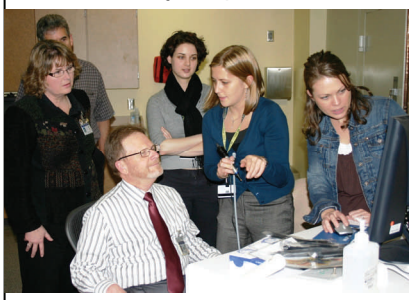
Turbin MT, (PI) Echt K, Henry JA, Suhler E (CO-Is). Self Management Groups for Veterans with Dual Sensory Loss. VA RR&D Pilot Project.

Konrad-Martin D (PI). Longitudinal changes in auditory function among Veterans with diabetes. VA RR&D Pilot Project.

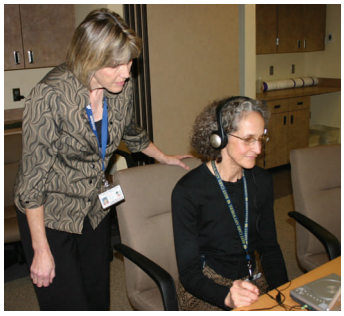
NCRAR Open House (continued from Page 6)



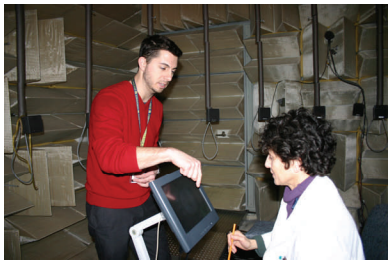
and clear, and is usually pinkish-grey in color. When looking at a healthy ear drum, a "cone of light" can be seen, which is the light from the otoscope reflected back off the ear. Some abnormal otoscopy findings include a bulging eardrum or an eardrum that is sucked inwards, an eardrum that is opaque or dull in appearance, or one that is yellow, gray or red. There can be amber fluid or bubbles behind the eardrum or the eardrum may be perforated. Otoscopy is a routine and critical examination that is carried out at the start of all audiometric evaluations.



At the fourth station visitors listened to hearing loss simulations. These simulations made it clear that when you have a hearing loss, everything sounds not only quieter but also distorted. Most hearing loss is a result of the aging process and/or exposure to noise. Both result in damage to the cochlea (inner ear). The cochlea sends information about sound to the brain, provides information about pitch and loudness, and is involved with filtering out background noise. So, damaging the cochlea leads to sounds becoming distorted. Typically noise-related and age-related hearing loss is worse at high pitches than low pitches, so because sounds from high-pitched instruments, like flutes and violins, cannot be heard, music sounds dull. For the same reason, high-pitch speech sounds, like 's', 'th' and 'f' cannot be heard, while low pitch ones, like 'ah', 'm' and 'j' can be heard – so speech sounds mumbled. Researchers at the NCRAR are using simulations of hearing loss in their educational hearing loss prevention programs to emphasize the negative effects of hearing loss, in the hope that it will motivate people to protect their hearing by avoiding loud noise or by using hearing protection.



The final station guests visited was the anechoic chamber. An anechoic chamber is a room that is nearly "echo-free". This simulates what it would sound like if you were outside with no wind or reflective surfaces. It can be thought of as one of the quietest places on Earth.



Special materials and 'wedges' on the walls, floor and ceilings absorb all of the sound. In a normal room, the sound is reflected back off the walls, floor, and ceiling to your ears. At the NCRAR we use the chamber for hearing aid research, sound localization studies (how well humans can determine where a sound is coming from), acoustic transducer studies, and other sound field research.

After the tour, visitors had the opportunity to obtain Tempo credit by completing a short quiz and to chat with NCRAR investigators over a cup of coffee and a cookie.

Over the afternoon we heard many positive comments such as:

"The NCRAR's Open House was a multi-sensory experience – I liked the hands-on demonstrations."

"Watching the Flintstones cartoon demonstration helped me better understand what having a hearing impairment would be like, and made me want to protect my ears and hearing!"

"I was really impressed by the state-of-the art equipment. I can definitely see how Veterans would benefit from the research being done at NCRAR."

Come and visit us at the next NCRAR Open House to be held in May, during Speech and Hearing Month.