

# Neuroaudiology Newsletter

Writer/Editor:  
Alyssa Everett, BS

Contributor/Supervisor:  
Frank E. Musiek, PhD

Publication Date:  
May 1, 2015

## Lectures in Auditory Disorders and Sciences (LADS)-Jos Eggermont presents on April 15, 2015 at The University of Arizona



*Pictured from left: Barrett St. George, Jos Eggermont, Nicole Denny, Chloe Robbins, Diane Cheek, Alyssa Everett and Frank Musiek*

### Summary from the Lecture:

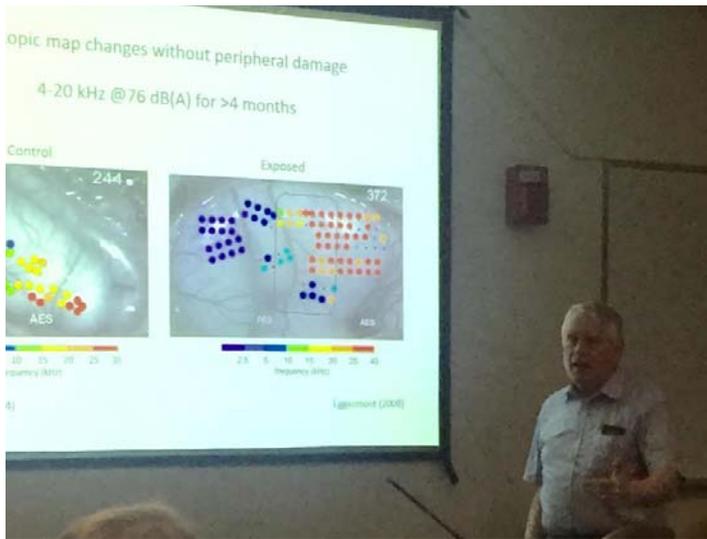
Funded by the Royal Arch research program, Dr. Eggermont presented to a group of about 40 people. Guidelines for “safe” times of exposure to noise have been established and are accepted universally. Previous research has studied unsafe time exposures at great length to conclude that the guidelines are accurate. It is also agreed upon that if you remove yourself from the noise for 12 hours, any threshold shift would return to baseline. Dr. Eggermont’s presentation on April 15, 2015 was based upon the long-term effects of exposure to “safe” noise levels. Long-term noise exposure is clinically relevant because many people work in conditions where the noise levels are steady yet repetitive over an extended period of time. In this study, two sets of cats were analyzed: Adult cats exposed to broadband noise of 80 dB SPL for a 4 month time period and adult cats exposed to broadband noise of 68 dB SPL for 6 weeks. The cats that were exposed for 4 months endured a constant

### *More about our students*

•••

Chloe Robbins is a first year doctoral student of audiology. She is currently working on an Independent Study with Dr. Frank Musiek. She is interested in central auditory processing disorders and audiologic rehabilitation.

She is studying different types of central auditory processing tasks (i.e. dichotic listening, binaural integration, and temporal order). Her final independent study project will include a paper about neuromorphological abnormalities that can lead to CAPD, including ectopic areas, migrational problems, and polymicrogyria in the cortex. She will conduct a longitudinal review of the work published in this area, including work by Galaburda, Diaz, and Boscaroli.



noise for 8 hours a day, whereas the cats that were exposed for 6 weeks were intermittently exposed; 12 hours of noise, followed by 12 hours without. Neural firing rates, ABRs and MLRs were analyzed and compared to a control group of cats who were not exposed to long-term noise.

The mean electrophysiologic activity in control cats showed equal neural firing rates at all frequencies in the same recording time frame. The control cats also had a tonotopic organization in the primary auditory cortex with center frequencies at well-spaced points along the cortex. The cats that were exposed showed

an unequal cortical representation of firing rates across frequencies. More specifically, there was minimal neural firing in the 4-20 kHz range (which happened to be the exact spectral range of the broadband noise). Mapping of the cortical tonotopic organization revealed disrupted center frequencies that differed greatly from the unexposed cats. After a 3 month recovery time, the center frequencies still did not reorganize back to baseline measures, which was a significant finding of the deterioration of the tonotopic map. The exposed cats showed no difference of their ABR or MLR thresholds, indicating no apparent change in the periphery up to the level of the thalamus. Conclusions from the study indicate that when testing for noise exposure, peripheral testing is insufficient for the identification of auditory system damage. Additional tests need to be conducted that involve higher-order processing, (e.g., speech in noise tests). Exposure to long-term noise that is repetitive and constant should be examined by central, in addition to peripheral means.

## **NEW PUBLICATION BY OUR STUDENTS!**

### *Cryoloop Cooling: A Research Advance with Clinical Implications*

*"Cryoloop cooling can create a lesion in the central nervous system by deactivating neural responses but then it can be reversed. It helps preserve the animal's functional integrity and provides insights to disordered systems that have not been achieved before" (St. George, Cheek, Everett, & Musiek, 2015).*

<http://hearinghealthmatters.org/pathways/2015/cryoloop-cooling-a-research-advance-with-clinical-implications/>

## *New Post-Doctoral Audiology Student at the University of Arizona!*



Renata Filippini (pictured left) will be joining us at the University of Arizona in the fall of 2015, for a post-doctoral fellowship in the department of Speech, Language, and Hearing Sciences. Dr. Filippini received her B.S. in Speech, Language, and Hearing Sciences in 2005 and her Ph.D. in Rehabilitation Sciences in 2012 both from the University Of Sao Paulo School Of Medicine, in Brazil. Her current research involves Auditory Temporal masking, but she is interested in Temporal Processing as a whole and how it relates to language disorders and development. While at the U of A, Dr. Filippini plans to further her studies in this topic as well as other issues related to Temporal Processing. Dr. Filippini has chosen to study at the U of A because Dr. Musiek has supported her research from the beginning, and the opportunity to learn directly from him is one she could not pass up.

## *Updates from the American Academy of Audiology*

The **Pathways meeting** at the Audiology NOW! Convention was a great success. There was nearly 90 people in attendance with a significant amount of participation. At the meeting, a vote to add an educational program to the future meetings was entertained. From a lopsided vote, it was approved. From now on, the Pathways meeting will be part administrative and part educational, related to central auditory processing disorders/neuroaudiology.

**Frank Musiek**, of the University of Arizona, has been selected by the American Academy of Audiology to chair the 2016 **Auditory Research Conference (ARC)**. The ARC is part of the AAA annual meeting, held in **Phoenix, Arizona, April 13, 2016**. The conference topic will be Advances in the Diagnosis and Management of Auditory Processing Disorders.

**A tool kit** for implementing **auditory training** procedures in children and adults with auditory processing disorder was introduced at the AAA conference by Gail Chermak, Washington State University, Jeff Weihing, University of Louisville, and Frank Musiek, University of Arizona. This computer kit allows the use of a variety of formal and informal auditory training methodologies with great flexibility.

**Stephanie Waryasz** of the University of Connecticut was one of 5 awardees who were selected to present at the student research forum at AAA. Stephanie presented on the effects of concussion on university athletes as measures by tests of auditory processing (see previous newsletter for more details). Her advisor is Frank Musiek of the University of Arizona.

## *Recently Published Refereed Articles*

- Weihing, J. & Musiek, F. (2014) The Influence of Aging on Interaural Asymmetries in Middle Latency Response Amplitude. *Journal of the American Academy of Audiology. Journal of the American Academy of Audiology*, 25, 1-11.
- Palmer, S. & Musiek, F. (2014) Electrophysiological Gap Detection Thresholds: Effects of Age and Comparison with a Behavioral Measure. *Journal of the American Academy of Audiology*.
- Maro, I., Moshi, N., Clavier, O., Mackenzie, T., Kline-Schoder, R., Wilbur, J., Chambers, R., Fellows, A., Jastrzembski, B., Mascari, J., Bakari, M., Matee, M., Musiek, F., Waddell, R., Fordham von Reyn, C., Buckey, J. (2014) Auditory Impairments in HIV-Infected Individuals in Tanzania. *Ear & Hearing*, 35, 306-317.

## *Past Neuroaudiology Newsletters/Other Important Neuroaudiology Sites*

- March 2015 Newsletter: <http://slhs.arizona.edu/wp-content/uploads/2015/03/Neuroaudiology-Newsletter.pdf>
- <http://musiek.faculty.arizona.edu/>
- For weekly updates on new neuroaudiology articles refer to the Neuroaudiology section of Pathways on HHTM: <http://hearinghealthmatters.org/pathways/>