29th Biennial Symposium of the International Evoked Response Audiometry Study Group

Title: Electrophysiological Assessment in Preterm Infants: Brainstem to Cortex

Bio: Chelsea Blankenship, Au.D., Ph.D., is an Assistant Professor at Cincinnati Children's Hospital. She has a strong background in behavioral and physiologic measures of the auditory system, cochlear implants, and clinical-translational research. Her long-term career goal is to become an independent clinician-scientist using translational methods to improve the diagnosis and treatment of pediatric hearing loss. Her research interests include: (1) examine how the auditory system processes sound using novel behavioral and neurophysiological techniques, (2) improve diagnostic measures to identify hearing difficulties, and (3) develop objective tools to assess speech perception outcomes for clinical management of pediatric hearing loss.

Abstract: Over 400,000 infants are born preterm every year in the United States which places the infant in a particularly vulnerable state for hearing, visual, motor, cognitive, speech-language, and literacy deficits. Approximately 10% of preterm infants have permanent hearing loss or are at risk for delayed or progressive hearing loss. Many infants receive aminoglycoside antibiotics, increasing their risk for high-frequency, progressive hearing loss. About 40% of very and extremely preterm infants (≤32 weeks gestational age [GA]) develop speech-language disorders by school entry. However, currently it is not possible to identify which infants will develop speech-language disorders resulting in delayed diagnosis and intervention. This presentation will review results from an ongoing longitudinal study that aims to improve early prediction of speech, language, and pre-literacy deficits in infants born very and extremely preterm. The study includes 150 infants assessed from birth to 3 years with resting-state functional MRI, spontaneous and speech-evoked EEG, and comprehensive hearing and speech-language measures. The focus of the presentation will be on electrophysiological assessments at 3 months of age including: 1) chirp-evoked Auditory Brainstem Response to detect slight and high-frequency hearing loss, 2) spontaneous EEG to assess neural activity and functional connectivity between brain regions in quiet, and 3) speech-evoked EEG to index's the infant brain's sensitivity to speech sounds. Analysis will include comparisons to a cohort of fullterm healthy infants, evaluate the impact of sub-cortical auditory function on cortical measures, and explore relationships with medical factors from the NICU, socio-demographic variables, MRI brain abnormality scores, and language outcomes at 2 and 3 years corrected age.