Abstract
The littlest thinkers:

This is an ongoing research study investigating neonatal cognitive development using EEG (electroencephalogram) and auditory event-related potentials (AERPs). Very little is known about the cognitive brain development in neonates, and even less is known about neonates who have neurologic concerns, as they are often excluded from participation in other developmental studies. We used a non invasive and non participatory method for analyzing cognition by way of the mismatched negativity (MMN) event related potential. This is a cortically evoked electrophysiological response to the brain's awareness of a change in auditory stimuli. The negative EEG deflection that occurs between 150-400ms after a time-locked surprising sound is highly sensitive to cognitive abilities.
We expect a more robust AERP response to negatively correlate with the neonate's clinical outcome such as length NICU stay, duration of supplemental oxygen, and time to full nipple feeds.
To date we have collected data on three participants. All three were on HIE cooling protocol and completed the task while on cooling, and again once rewarmed.

Aim#1- Gather within subject AERPs on neonates who are receiving an EEG during both the cooling and rewarming phases for neonatal therapeutic hypothermia.

Aim#2- Run the MMN paradigm on neonates that are receiving an electroencephalogram as part of their clinical management to investigate how neurologic concerns, such as seizures, influence their AERP response.

Aim#3- Gather characteristics from those participants who attend a follow up exam a few months after discharge from the NICU. Neonatal characteristics to be collected include, but are not limited to age, weight, MRI (magnetic resonance imaging) results, cerebral ultrasound brain characteristics, temperature, medications, respiratory support, feeding method, date of full nipple feeds, NICU discharge date, and birth complications.