[format: single space, 1inch margin, text+figures/tables no more than 2 pages, references can go over the two-page limit]

**Title**: Detecting and Disambiguating “Hidden” Cochlear Pathologies

**Data Description: [Include the following information]:**

Many cochlear pathologies do not result in measurable changes to audiometric thresholds, complicating both the diagnosis and treatment of such disorders. Auditory nerve loss, inner hair cell (IHC) damage, and cochlear synaptopathy (CS) can masquerade as clinically normal hearing despite potentially having detrimental effects on suprathreshold listening and speech perception. This has sparked a search for biomarkers that can accurately diagnose these pathologies. The middle ear muscle reflex, the envelope following response, and auditory brainstem response have been suggested as biomarkers of cochlear synaptopathy, but the specificity of these diagnostic tools remains unclear. Precision diagnostics selective for a specific pathology are essential to the development of targeted interventions for hearing loss, especially pharmaceuticals. Here, we investigated whether tools developed as assays of CS were also sensitive to loss of IHCs and if the two types of pathologies could be disambiguated.

-brief description of the experiments

-what data is collected (measurements? Pictures? Sound/video Recordings? Sequences etc.)

Seven chinchillas (n = 4 male) were exposed to a 1000 Hz octave band noise for 2 hours to induce cochlear synaptopathy following a temporary threshold shift (TTS). Eight animals (n = 4 male) were administered 38 mg/kg i.p. Carboplatin (CA) to induce mild (~15%) selective inner-hair-cell loss and significant stereocilia dysfunction in the surviving inner hair cells. Hearing was evaluated before and 2 weeks after exposure using a battery of minimally-invasive diagnostic measures. These measures included auditory brainstem response (ABR) to estimate hearing thresholds, ABR to a high level click, distortion product and stimulus frequency otoacoustic emissions (OAE), wideband middle ear muscle reflexes (MEMR), and envelope following responses evoked by rectangular amplitude modulated tones (RAM-EFR).

-What taxa are involved?

-Location

-Duration, intervals of the experiments

-Number of relational tables (analyze at least two tables), dimensions of the data

**Aims of the experiments**:

List questions the authors/you plan to answer.

**Hypotheses: Although most measures will not differentiate between inner hair cell and synapse pathology, the combination of measures will aid in identification of the two groups. (can be omitted for undergrads if you only plan to explore patterns present in the data)**

**Proposed methods**:

-What R packages/functions do you plan to use?

-What kind of figures do you plan to communicate the findings?

-What statistical methods do you plan to test the hypotheses?

**Simple summary stats of the data:**

-present at least 1 figure, displaying some summary statistics of the data (include the code)

Provide the git repo website for the project that includes your curated data (if too large, you can upload only a small sample of the data)

**References**

Include relevant literature for the background of your research question.

Include relevant literature that generates or utilizes the datasets