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An Online Wideband Acoustic Immittance (WAI) Database and Corresponding Website: Resource Review

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An online wideband acoustic immittance (WAI) database and corresponding website

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Wideband acoustic immittance (WAI) measures, which include absorbance, power reflectance, impedance, and other related quantities, offer an objective, noninvasive diagnostic tool for some middle-ear pathologies. An online database for normative adult WAI measures has been designed and implemented in MySQL, with the goal of enabling researchers to share and analyze data across studies. The database can be accessed via its corresponding website at: <http://www.science.smith.edu/wai-database/>

Anyone can access the database online and any researcher can request to have their peer-reviewed published data included in the database. The corresponding website includes directions to both submit and download data, example Matlab and R code to analyze or plot the data, and a Shiny Web Application to allow for real-time dynamic exploration of the data via a web browser. Rules for data inclusion and standards for datacoding are included on the website.

The database includes three tables, which report “PI information”, “Subject Information”, and “Measurements”. Included within the database, when available, are each subject’s age, sex, race, ethnicity, ear-canal area, peak tympanic pressure, and the equipment used to measure WAI; when a quantity is not known it is entered as “NULL”. In addition to absorbance, both magnitude and phase information of the impedance are included within measurements, allowing for the calculation of any WAI quantity.

As of July 1, 2019, the WAI database includes measurements from 12 published studies, collectively across 640 subjects and 914 normal middle ears at ambient ear-canal pressures. There are a total of 286,774 total data points across all measurements and frequencies. These measurements are summarized in Figure 1.

Future work includes adding to the adult normative database and expanding it to include WAI measurements from babies, children, and subjects with abnormal functioning middle ears.

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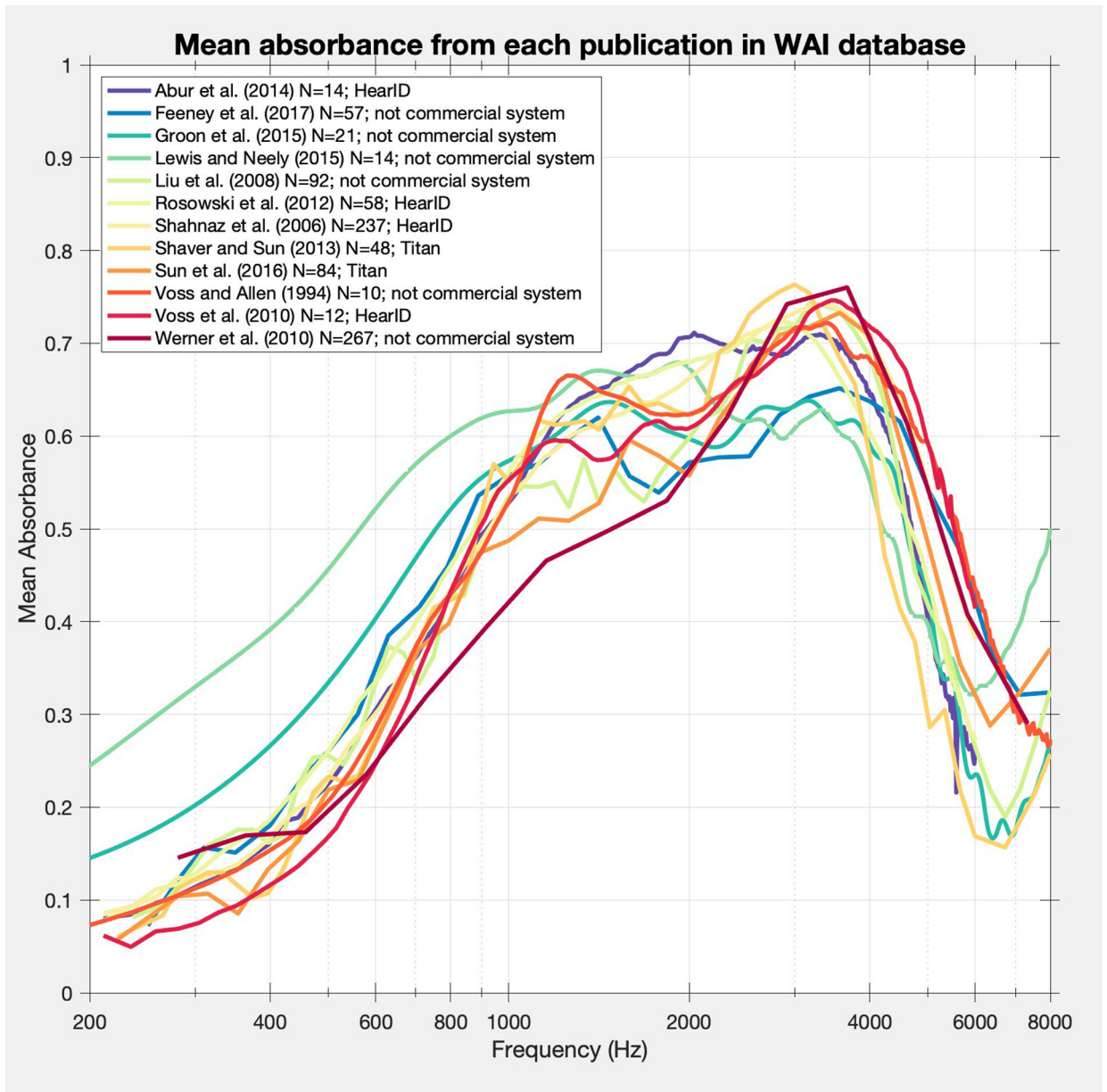


Figure 1:

Mean absorbances for the 12 studies within the WAI database as of July 1, 2019. Noted in the legend are the peer-reviewed publications associated with the datasets, the number of individual ears, and the equipment used in the study. When multiple measurements were made on the same ear, the average from those measurements was used in the calculation across subjects for a given study. Some subjects have measurements on both a right and a left ear, and some subjects have measurements from only one ear; this figure includes every ear in the database and does not control for the effect of number of ears from each subject.