1128-92-228 **Alexander G Dimitrov*** (alex.dimitrov@wsu.edu), 14204 NE Salmon Creek Ave, Vancouver, WA 98686. *Modeling perceptual invariances in biological auditory processing.* Preliminary report.

Sounds reaching our ears vary in multiple features: pitch, intensity, rate. Yet when we parse speech, our comprehension is little affected by the vast variety of ways in which a single phrase can be uttered. This ability to extract relevant information from wildly varying sensory signals is also ubiquitous in other sensory modalities. Even though the effect itself is well characterized, we do not understand the approaches used by different neural systems to achieve such performance.

In an ongoing project, we are testing the hypothesis that broadly invariant signal processing is achieved through various combinations of locally invariant elements. The main questions we would like to address are: 1. What are the characteristics of locally-invariant units in auditory pathways? 2. How are biological locally-invariant units combined to form globally invariant processors? 3. What are the appropriate mathematical structures with which to address and model these sensory processes? The mathematical aspects of the research involve an interesting combination of probability theory (a must in the study of biological sensory systems) and group theory, needed to characterize invariants and symmetries. (Received February 27, 2017)