1137-92-160 **Alexander G Dimitrov*** (alex.dimitrov@wsu.edu), 14204 NW Salmon Creek Ave, Vancouver, WA 98686. *Modeling of perceptual invariances in biological sensory processing.* Preliminary report.

A problem faced by all perceptual systems is natural variability in sensory stimuli associated with the same object. This is a common problem in sensory perception: Interpreting varied optical signals as originating from the same object requires a large degree of tolerance. Understanding speech requires identifying phonemes, such as the consonant /g/, that constitute spoken words. A major goal of an object recognition problem then is the ability to identify individual objects while being invariant to changes stemming from multiple stimulus transformations.

In an ongoing project, we are testing the hypothesis that broad perceptual invariance is achieved through specific combinations of what we term locally invariant elements. The main questions we would like to address are: 1. What are the characteristics of locally-invariant units in sensory pathways? 2. How are biological locally-invariant units combined to achieve broadly invariant percepts? 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 01, 2018)