Goals

Language is one of the most complicated phenomena in everyday life, and by far the most common means by which human beings interact with each other. Viewed as a dynamical system, it is fascinating that spatial (written) and temporal (spoken) patterns can couple brain states so effectively! Our goal in this project is **to model how neural states can be coupled physically by acoustic transmission**.

Plan

We will begin by developing a computer simulation of the basilar membrane of the cochlea, the organ responsible for mechanical spectral analysis of incoming auditory stimulation[5, 6]. The basilar membrane can be approximated as a series of coupled mass-spring oscillators with different resonant properties [1, 4]. We will test this simulation by coupling the boundary conditions with recordings of actual speech. Time permitting, we will develop a neural model of phoneme classification [3], which will be coupled to the output of the basilar membrane model. We may even go so far as to attempt a mechanical cochlea [1, 2].

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