This presentation describes research on the physics of human speech sound production. A classification for speech sound types is given, and correlated to aerodynamic or aeroelastic processes involved. Results from two focus areas are presented. The first addresses speech synthesis using physics-based models sounds production by turbulent jets in the vocal tract. Aeroacoustic theory was used to develop a reduced-order model of turbulent jet behavior. This model is implemented in an articulatory vocal tract model to synthesize vowel-consonant-vowel sequences, for consonants produced by turbulent jets. The second area, focused on voiced sound production, has worked to clarify the principal aerodynamic, aeroacoustic, and energy transfer mechanisms, using a combination of physical model measurements, computational modeling, and patient data.

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**Figure 1.** Cutaway of human upper airway, where speech sounds are made.
References


