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Glottal aerodynamics in compliant, life-sized vocal fold models
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— This talk presents high-speed PIV measurements in compliant, life-sized models of the vocal folds. A clearer understanding of the fluid-structure interaction of voiced speech, how it produces sound, and how it varies with pathology is required to improve clinical diagnosis and treatment of vocal disorders. Physical models of the vocal folds can answer questions regarding the fundamental physics of speech, as well as the ability of clinical measures to detect the presence and extent of disorder. Flow fields were recorded in the supraglottal region of the models to estimate terms in the equations of fluid motion, and their relative importance. Experiments were conducted over a range of driving pressures with flow rates, given by a ball flowmeter, and subglottal pressures, given by a micro-manometer, reported for each case. Imaging of vocal fold motion, vector fields showing glottal jet behavior, and terms estimated by control volume analysis will be presented. The use of these results for a comparison with clinical measures, and for the estimation of aeroacoustic source strengths will be discussed. Acknowledge support from NIH R01 DC005642.

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