Abstract Submitted
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Simultaneous temporally resolved DPIV and pressure measurements of symmetric oscillations in a scaled-up vocal fold model[1] HUNTER RINGENBERG, DYLAN ROGERS, NATHANIEL WEI, UNL, MICHAEL KRANE, Penn State - ARL, TIMOTHY WEI, UNL — The objective of this study is to apply experimental data to theoretical framework of Krane (2013) in which the principal aeroacoustic source is expressed in terms of vocal fold drag, glottal jet dynamic head, and glottal exit volume flow, reconciling formal theoretical aeroacoustic descriptions of phonation with more traditional lumped-element descriptions. These quantities appear in the integral equations of motion for phonatory flow. In this way time resolved velocity field measurements can be used to compute time-resolved estimates of the relevant terms in the integral equations of motion, including phonation aeroacoustic source strength. A simplified 10x scale vocal fold model from Krane, *et al.* (2007) was used to examine symmetric, *i.e.* 'healthy', oscillatory motion of the vocal folds. By using water as the working fluid, very high spatial and temporal resolution was achieved. Temporal variation of transglottal pressure was simultaneously measured with flow on the vocal fold model mid-height. Experiments were dynamically scaled to examine a range of frequencies corresponding to male and female voice. The simultaneity of the pressure and flow provides new insights into the aeroacoustics associated with vocal fold oscillations.

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Timothy Wei
University of Nebraska - Lincoln

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