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Aerodynamics of Vocal Fold Movement: A Novel Fluid-Structure Interaction Model COMER DUNCAN, Bowling Green State University, TODD HARMAN, JAMES GUILKEY, University of Utah — The present study applies a tightly coupled fluid-structure interaction algorithm to the modeling of the material dynamics and aerodynamics of phonation. The Material Point Method (MPM) is used to model the material and the Implicit Continuous-fluid Eulerian (ICE) method is used to model the aerodynamics. We focus on a two-dimensional model with specified transglottal pressure and simulate the aerodyanmics which results from the intrinsic coupling between the material and the air. The emergent properties of the system result from the close interplay between the two subsystems. We report visualizations of several cases showing the pressure field and vorticity field which results. The results demonstrate the promise of this approach to the modeling of the relation between material properties, aerodynamics, and eventual acoustical output of the model vocal folds.

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