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Towards Computational Modeling of Phonation Using CT–Based Laryngeal Models[1] S.A. MOHSEN KARIMIAN, RAJAT MITTAL, George Washington University — The oscillatory flow generated in human larynx plays a key role in the process of phonation. While much has been done to understand the main features of such flow by using idealized geometry models and simplified flow conditions, there is still little known about the 3D features of laryngeal flow. In this work, anatomically realistic models of the human larynx are used to analyze the fluid dynamics of 3D laryngeal flow using high–fidelity numerical simulations. A Cartesian–grid–based, finite–difference Navier–Stokes solver is used to carry out these simulations. Three–dimensional models of human larynx are extracted from CT images and unstructured surface grids are generated for the model geometries. The pressure driven flow is simulated for a range of Reynolds numbers. The main objective in this work is to understand more in–depth the effect of 3D geometric features of glottal airway on the laryngeal flow structure.

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