

Abstract Submitted
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Laboratory model of inner ear mechano-transduction¹ IBRAHIM MOHAMMAD, Student, University of Rochester, SRDJAN PRODANOVIC, PhD Student, University of Rochester, DANIELLE LAIACONA, Binghamton University, JONG-HOON NAM, Assistant Prof. of Mechanical Engineering and Biomedical Engineering, University of Rochester, DOUGLAS KELLEY, Assistant Professor of Mechanical Engineering, University of Rochester — A sound wave entering the mammalian ear displaces cochlear fluid, which in turn displaces hair-like organelles called stereocilia that act as acoustic sensors. Their incredible sensitivity is poorly understood, and probably depends on pre-amplification via fluid-structure interaction. In this talk, I will show how our lab uses a laboratory model to simulate this biological system to study the viscous coupling between the vibrating structures, cochlear fluid, and stereocilia. I will present measurements of modeled stereocilia gain and phase difference over a range of frequencies. Recent numerical simulations show that the sensor behaves as a high-pass filter with a gain plateau. However, our results show a peak in the gain. Further, I will show how the length of stereocilia affects gain.

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