









Fig. S1. The dimension reduction (A,B) and the Tikhonov (C,D) methods were applied to simulation data to recover the true input signal. Flow-through respirometry was simulated for two flow rates of 250 ml/min (A,C) and 500 ml/min (B,D), and artificial noise of 0.01%, 0.1%, 1%, 2%, 5%, and 10% was added to the output signal. The result of input estimation using both methods is presented here.



Movie 1. Opening and closing of the second thoracic spiracle in a grasshopper, recorded using a Leica stereo microscope. Anterior is to the left. The spiracle approximately is 0.5 mm in diameter.