

Abstract Submitted  
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**Gravity-driven sliding motion on soft porous layer.**<sup>1</sup> RUNGUN NATHAN, Penn State Berks, ZENGHAO ZHU, QIANHONG WU, Villanova University — Soft porous lubrication is a new concept in porous media flow. In this paper, we report a novel experimental study to investigate the gravity-driven sliding motion of a planar board over a tilted soft porous layer. A laser displacement sensor was used to measure the motion of the board, while a high-speed camera was adopted to capture the detailed compression of the porous layer when the board glided over it. The pore pressure generation, as a result of the compression, was recorded by pressure sensors mounted on the bottom surface of the porous layer. One finds that, the pressure distribution agrees well with theory developed by Wu & Sun (Wu Q. & Sun Q., *Med. Sci. Sport. Exerc.* 2011, 43:1955–63). Extensive parametric study was performed by varying the center of gravity of the planar board, the tilted angle and the porous material. Consistent agreement between the theory and experimental results was obtained. It shows that, the effect of soft porous lubrication is enhanced when the center of gravity moves toward to the trailing edge of the planar board, or the slope of the porous layer is increased, or smoother fibrous surface is used.

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