

Abstract Submitted  
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**Optical sensor for normal force distribution** MENGYUE SUN, The University of Akron — The adhesion strategies in biological systems have been widely studied and have been a great source of bio-inspirations for human adhesive technologies. For practical applications of these adhesives at macro scales, it is crucial to understand the distribution of stresses at interface of adhesive system. we develop an optical sensor based on frustrated total internal reflection (FTIR) optics. In theory of FTIR, if an object is placed within tiny distance from the total internal reflected interface, some light will pass through the interface, so the camera can receive the signal. According to this method, we can measure tiny deformation from soft materials such as PDMS, and calculate the tensile stress based on deformation, thus this optical sensor is much more sensitive than the other biological sensors. Our sensor is composed of dove prism, 532nm laser beam light source, and several mirrors. The dove prism is used to achieve the FTIR at the interface between glass and PDMS thin film. According to calibration, our setup can measure distance in range of 0nm to 300nm accurately, and after applying pressure on the PDMS film, we did see signal but some improvements need to be made in future work.

Mengyue Sun  
The University of Akron

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