Electronic skins, or e-skins, are electronic devices capable of sensing physical interactions such as strain while still being flexible (Hammock et.al., 2013). These e-skins are of interest in a variety of fields including robotics, structural health monitoring, and medicine (Leng and Asundi, 2002). Flexible strain sensors in particular have applications in e-skins, especially in the field of robotics (Chang et.al., 2010). A flexible strain sensor suitable for use as an e-skin must be able to measure strain over a larger range of elongation than traditional metal or ceramic strain sensors. Current solutions to this problem involve expensive sensors constructed with specialized materials (Chang et.al., 2010). This poster explores the synthesis of a flexible biaxial strain sensor for surface strain measurement. The sensor is made by spraying exfoliated graphite/latex mixture on a latex substrate to form a 4 by 4 grid. Electrodes are connected to each sensor to collect deformation induced voltage difference. The dispersion of the exfoliated graphite in the latex is studied using scanning electron microscopy. The characteristics of the sensor will be studied by attaching it on a tensile testing specimen and by analyzing the deformation and voltage data. The sensor is cheap and anticipated to measure large strain that cannot be achieved with commercially available strain gauges.