Abstract: We extend the deep and important results of Lichnerowicz, Connes, and Gromov-Lawson which relate geometry and characteristic numbers to the existence and non-existence of metrics of positive scalar curvature (PSC). In particular, we show: that a spin foliation with Hausdorff homotopy groupoid of an enlargeable manifold admits no PSC metric; that any metric of PSC on such a foliation is bounded by a multiple of the reciprocal of the foliation K-area of the ambient manifold; and that Connes' vanishing theorem for characteristic numbers of PSC foliations extends to a vanishing theorem for Haefliger cohomology classes.