It has been a classical question which manifolds admit Riemannian metrics with positive scalar curvature. I will present some recent progress on this question, ruling out positive scalar curvature on closed aspherical manifolds of dimensions 4 and 5 (as conjectured by Schoen-Yau and by Gromov), as well as complete metrics of positive scalar curvature on an arbitrary manifold connect sum with a torus. Applications include a Schoen-Yau Liouville theorem for all locally conformally flat manifolds. The proof of these results are based on analyzing generalized soap bubbles - surfaces that are stable solutions to the prescribed mean curvature problem. This talk is based on joint work with O. Chodosh. .