1103-53-3 **William M. Goldman*** (wmg@math.umd.edu), College Park, MD 20742. *Moduli spaces and the classification of geometric structures on manifolds.*

In the late 19th century, Sophus Lie and Felix Klein proposed that a *geometry* is governed by its group of symmetry transformations. This led Élie Cartan and Charles Ehresmann to develop a theory of geometric structures based on local symmetries. Consider a *topology* (a manifold Σ) and a *geometry* (a homogeneous space $X = G/H$). Classify all the possible ways of introducing the local geometry of X into Σ.

For example, a sphere admits no local Euclidean geometry: there is no metrically accurate Euclidean atlas of the earth. In contrast, the topology of the 2-torus admits a rich moduli space of Euclidean structures. The general classification involves a *deformation space* of marked (G, X)-structures on Σ, upon which the diffeotopy group $\pi_0\mathsf{Diff}(\Sigma)$ acts. Furthermore, the deformation space itself is *locally modeled* on the quotient space $\mathsf{Hom}\big(\pi_1(\Sigma), G\big)/\mathsf{Inn}(G)$, inheriting rich geometric and algebraic structures.

We survey several examples of the successful classification of geometric structures on manifolds, indicating several open problems in this subject. (Received August 01, 2014)