Patrick Ghanaat: Gromov-Hausdorff distance and applications.

It was discovered in the 1920's hat the set of all compact subsets of a metric space X again carries the structure of a metric space with respect to a natural distance, now called the Hausdorff distance. Gromov modified the definition of this distance so that it becomes a metric on the set of (isometry classes of) all compact metric spaces, not necessarily subsets of a given space X.

This distance recognizes some essential properties of the spaces considered but allows for compactness theorems under reasonable hypotheses.

After an introductory part on Hausdorff's metric, this lecture will describe Gromov's Hausdorff distance for metric spaces and its various equivalent characterizations in some detail, then discuss basic properties of the distance as well as the corresponding notion of convergence including the Gromov compactness theorem.

In the last part, standard applications will be outlined, mainly in the more restricted context of Riemannian manifolds.

Sources:

Bridson,Haefliger: Metric spaces of non-positive curvature

Burago, Burago, Ivanov: A course in metric geometry

Petersen: Gromov-Hausdorff convergence of metric spaces