We present a mathematical and algorithmic framework for the continuation of point clouds via persistence diagrams. We show that the persistence map, which assigns a persistence diagram to a point cloud, is differentiable. This allows us to apply the Newton-Raphson continuation method in this setting. Given an initial point cloud $P$ and a its corresponding persistence diagram $PD$, we apply continuation to find a new point cloud $P'$ close to $P$, that have a prescribed persistence diagram $PD'$ close to $PD$. We present algorithms to perform the continuation as well as some computational results. This is joint work with Yasuaki Hiraoka (WPI-AIMR, Tohoku University) and Ippei Obayashi (WPI-AIMR, Tohoku University).