Approaches to unsupervised clustering with data-dependent distances are proposed. By considering metrics derived from data-driven graphs, robustness to noise and cluster geometry is achieved. The proposed algorithms enjoy theoretical guarantees on flexible data models, and also have quasilinear computational complexity in the number of data points. Applications to a range of real data will be shown, demonstrating the practical applicability of our methods. Joint with Anna Little (Michigan State University) and Mauro Maggioni (Johns Hopkins University). (Received January 18, 2019)