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Emilie Dufresne, Parker Edwards and Heather A Harrington*, harrington@maths.ox.ac.uk,
and **Jonathan D Hauenstein**. *Topological data analysis of real algebraic varieties*.

We study real algebraic varieties using topological data analysis. Topological data analysis (TDA) provides a growing body of tools for computing geometric and topological information about spaces from a finite sampling of points. We present a new adaptive algorithm for finding provably dense samples of points on real algebraic varieties given a set of defining polynomials. The algorithm utilizes methods from numerical algebraic geometry to give formal guarantees about the density of the sampling and it also employs geometric heuristics to minimize the sampling. Since TDA methods consume significant computational resources that scale poorly in the number of sample points, our sample minimization makes applying TDA methods more feasible. We demonstrate our algorithm with examples and present our findings. (Received September 18, 2016)