

**Persistent homology and the Morse-Smale complex  
as tools in topological data analysis and an application in chemistry**

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Persistent homology and the Morse-Smale complex have become crucial tools in topological data analysis. The former is a parameter dependent homology theory which encodes “birth” and “death” times of homology groups in terms of the parameter. The latter is a CW complex decomposition of a smooth manifold constructed out of a Morse function fulfilling some technical additional property. In the talk, both concepts will be explained in more detail. An application will be given from chemistry where these concepts may help to understand the properties of the energy landscape describing the dynamics of a molecule.