1135-54-325   **Leo Carlsson**, **Gunnar Carlsson** and **Mikael Vejdemo-Johansson***, 2800 Victory Boulevard, 1S-215, Staten Island, NY 10314. *Fibres of Failure: diagnosing predictive models using Mapper.* Preliminary report.

The Mapper algorithm is able to produce intrinsic topological models of arbitrary data in high dimensions. Through a statistical adaptation of the Nerve lemma, the algorithm can be seen to reproduce the topology and parts of the geometry of the data source under assumptions of dense sampling and good parameter choices.

In this talk, we will describe how by careful choice of the Mapper model parameters, the resulting topological model can be guaranteed to separate input values to the predictive process for prediction error, grouping high-error and low-error regions separately.

This approach produces a diagnostic process where local failure modes can be classified, feeding into either a model development process or a local correction term to improve predictive performance. We have successfully applied this approach to temperature prediction in steel furnaces. (Received August 24, 2017)