3A.2 **Time-Dependent Dielectric Breakdown Statistics in SiO_2 and HfO_2 Dielectrics: Insights from a Multi-scale Modeling Approach by** A Padovana and L. Larcher, MDLSoft Inc.

The authors attempt to look at the differences in the statistical distribution of TDDB for SiO2 and HfO2 dielectrics under the percolation framework, making use of a multi-scale multiphysics defect simulation platform called GINESTRA®. They highlight the possibility of "defect clustering" around existing oxygen vacancy defects in HfO2, which are not observed in SiO2 and "quantify" the impact of this clustering trend on the TDDB distribution and Weibull Slope scaling relationship with oxide thickness. Their results provide support for the "insensitivity" of Weibull Slope to oxide thickness scaling in high-K dielectrics, as shown by the figure below. These results, if proven experimentally, may fundamentally force us to relook at the percolation model and consider using non-Weibull distributions for lifetime estimation of ultra-thin dielectrics in the future.