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Thomas M. Fiore* (fiore@math.uchicago.edu), Department of Mathematics, University of Chicago, 5734 South University, Chicago, IL 60637, and **Simona Paoli** and **Dorette Pronk**. *The Homotopy Theory of n-fold Categories*.

When are two categories the same? One possible notion of weak equivalence is an equivalence of categories, another is a functor whose nerve is a weak homotopy equivalence of simplicial sets. As is well known, these distinct notions of weak equivalence between categories have been encoded in model structures by Joyal-Tierney and Thomason. One can ask the same question for Ehresmann's internal categories in Cat : when are two double categories the same? There are several reasonable notions of weak equivalence. Together with Simona Paoli and Dorette Pronk, we have incorporated them into model structures. One intriguing aspect of the Thomason structure on Cat is that it is Quillen equivalent to SSet and hence also Top . In this talk I will also report on recent progress on a model structure for n -fold categories which extends the Thomason structure on Cat . This is joint work with Simona Paoli. (Received August 07, 2008)