1152-55-10 **Nick Scoville***, 601 E Main Street, Math and CS, Collegeville, PA 19426, and **Desamparados Fernández Ternero**, **Enrique Macias** and **Jose-Antonio Vilches**. *Strong discrete Morse theory with an application to simplicial Lusternik–Schnirelmann category.*

In this talk, we develop a framework for discrete Morse theory to allow us to detect strong collapses introduced by Minian and Barmak. This is accomplished by defining a so-called strong discrete Morse matching on the Hasse diagram, a definition similar to that of the generalized discrete Morse function. We then show an analogue of Forman's discrete Morse theorem that a simplicial complex strongly collapses through regular values. This involves in addition to critical values, so-called critical pairs which are elementary collapses not part of a strong collapse. Together these make up the critical objects of a discrete Morse function. One application for this work is to relate it to the simplicial Lusternik–Schnirelmann (LS) category, denoted $\mathrm{scat}(K)$, of Fernandez-Ternero, Macias, and Vilches. This is intuitively defined as the minimum number of strongly collapsible complexes in K that it takes to cover K. The simplicial version of the classic LS theorem states that if f is a discrete Morse function on K and $\mathrm{scrit}(f)$ denotes the set of all critical objects of f, then $\mathrm{scat}(K) + 1 \leq |\mathrm{scrit}(f)|$. (Received May 24, 2019)