1163-55-1434 **Shelley B Kandola*** (kandola2@msu.edu) and **Elizabeth Munch** (muncheli@msu.edu).
Algorithms for the Lusternik-Schnirelmann category of finite topological spaces.

Topological complexity (TC) is a homotopy invariant rooted in the robot motion planning problem. Given a path-connected space X that represents a robot's space of configurations, $TC(X)$ gives the minimum number of continuous motion planning rules required to program that robot to move from one position into another position. It is not unreasonable to assume a robot is only capable of obtaining finitely many positions. When the space is T_0, we can model that finite space by a poset, P. In an absence of algorithms for directly computing the TC, there has been interest in the upper- and lower-bounds of TC. A popular bound is determined by the Lusternik-Schnirelmann category, which is the minimal number of open sets covering a space whose inclusion is nullhomotopic. For a finite space P, this yields the upper-bound

$$TC(P) \leq cat(P)^2.$$

In this talk, we present original theorems and algorithms used in determining $cat(P)$, including a Python class in which we have implemented these results. (Received September 15, 2020)