1145-57-594 **Yuanan Diao*** (ydiao@uncc.edu), Department of Mathematics and Statistics, University of North Carolina Charlotte, 9201 University City Blvd, Charlotte, NC 28223. *Realizing knots by physical ropes.*

When one tries to tie a knot using a physical rope, one immediately realizes that if the rope is not long enough, then you cannot tie the knot. The minimum length of a rope of unit thickness required to tie a certain knot is called the ropelength of the knot. In this talk, various problems and progresses concerning the ropelength of knots will be discussed. These include the global minimum ropelength of all non-trivial knots, the general lower bounds and upper bounds for the ropelength of various knot families in terms of their crossing numbers. In general, for any given knot with crossing number n, the ropelength is bounded below by $O(n^{3/4})$ and it is known that the 3/4 power in the bound is sharp. On the other hand, $O(n^{3/4})$ is not a general upper bound since there are infinitely many knots whose ropelength is at least of the order of $O(n)$. While there are many knots whose ropelength is bounded above by $O(n)$, it is not known whether this is the best upper bound. To date, the best known upper bound is of the order of $O(n\ln^5(n))$. The talk also discussed the counterpart of the ropelength problem in the discrete setting, namely the minimum length of a knot realized on the simple cubic lattice. (Received September 11, 2018)